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Unhealthfulness
of London.

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HEALTH OF TOWNS, AND OF LONDON ASSOCIATIONS.

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UNHEALTHINESS OF LONDON,

AND

THE NECESSITY OF REMEDIAL MEASURES;

BEING

A LECTURE

DELIVERED AT

THE WESTERN AND EASTERN LITERARY AND SCIENTIFIC INSTITUTIONS,

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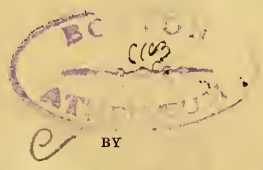

BY

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The nuisances which are referred to in the following Lecture have been selected, with one exception, from those which abound in the vicinity where the Lecture was last delivered. But it is not to be inferred that such nuisances infest one part of London alone; they abound in nearly every part of it.

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A LECTURE,

&c. &c.

Gentlemen,

I have the honour to appear before you, on this occasion, as a member of the Health of Towns Association; chiefly, however, as a member of the Health of London Association. These two Associations have been formed by philanthropic noblemen and gentlemen, who felt the necessity of some combined efforts being made to improve the health, and with the health, the moral, social, intellectual, and religious condition of the inhabitants of our great towns. The first Association embraces in its operations the towns in England; the last confines its efforts to London. By the Health of Towns Association, great progress has been made in enlightening the public mind, and much good has been effected. The Health of London Association, though of recent origin, has already brought forth good fruit. Three thousand lists of fifty-one queries, as to the circumstances affecting the health of the metropolis, have been circulated amongst the most intelligent men, and the best informed classes; and a Digest of the information contained in the replies, returned to these queries, has been made, and most extensively circulated.

Having been one of the four gentlemen appointed to draw up this Digest, I trust that the information which I shall be enabled to lay before you as to the sanitary condition of London, and more especially of your own districts, will be of such a nature as to impress you with a strong conviction of

the necessity which exists for you to be up and stirring in a cause which, more than all others, is peculiarly your own, and which, from the propitious circumstances of the times, the public feeling, and the desire generally manifested to turn away from objects of political strife, to the far nobler objects of moral, intellectual, and social improvement, can now be looked forward to with every hope of being triumphantly carried to a successful termination. Few, at the present time, doubt that, on rational liberty, and good government, much of our happiness must depend. All questions, therefore, in which these are mooted must engage our attention; but among such public questions there is great reason to doubt whether there is any social or political evil now existing, which we are so much interested in removing, as the heavy grievance of being compelled to live in the midst of filth, and air defiled by a thousand abominations and pestilential exhalations, and with an insufficient supply of one of the chief necessaries of life,—pure water.

In the short space of time which it is permitted me to address you, I shall endeavour to direct your attention — Firstly, to the relative mortality of different countries as compared with England. Secondly, to the comparative mortality in the town and country districts of England. Thirdly, to the comparative mortality of different parts of the same town. Then, to the classes upon which the mortality chiefly falls; and Lastly, to the ascertained causes of the deterioration of the health, and the mortality of the inhabitants of towns in general, and London in particular.

I shall divide the causes of disease into those which contaminate and corrupt the air, and produce miasmata, and into those which alter the composition of the air, and impair its life-sustaining properties, but which do not generate miasmata.

From the tables compiled by the Registrar General, we learn that the mortality of the English population in the five years 1838-42, was 2.209 per cent., or nearly *one* in 45. The mortality in 1842, was 2.167, or nearly *one* in 46. The com-

parative mortality in England, France, Sweden, Prussia, Austria, and Russia, is exhibited in the following table:—

ANNUAL MORTALITY.

	Year.	Years.	Per Cent.	Living to 1 Death.
England	1841	1838-42	2.207	45
France	1841	1838-42	2.397	42
Sweden	—	1801-05	—	41
Prussia	1840	1838-41	2.658	38
Austria	1840	1839-42	2.995	33
Russia	1842	1842	3.590	28

Scotland and Ireland are excluded, no steps having been taken to register and abstract the births and deaths in these countries; the only countries in Europe where such facts are not recorded and analyzed, except Hungary, Spain, Turkey, and Greece.

It is extremely satisfactory that the mortality in England is so much less than in the other great states of Europe; but it can by no means serve as an argument that the mortality in England is not excessive, and still less that the mortality in our chief towns may not be very greatly diminished by proper sanitary regulations.

The necessity for sanitary measures to diminish the mortality in our large towns, will be proved by the appalling statements of the annual sacrifice of life which we voluntarily submit to. Thus, it appears, from a table contained in the Appendix to the Third Annual Report of the Registrar General, that the relative mortality of a town and country population is very different; the Registrar having taken certain country districts, and town districts, containing each upwards of three millions and a half, found the following result:—

	Area, sq. Miles.	Estimated Population, Jan. 1, 1839.	Deaths registered in 2 Years.	Inhabitants 1 sq. Mile.	Annual Mortality.
Country Districts .	17.254	3.559.323	129.628	206	1 in 54.91
Town Districts . .	747	3.769.002	197.474	5.045	1 in 38.16
England & Wales .	57.805			265	1 in 46.00

It has been further shown, that, out of every million living in country districts where the number of inhabitants to each square mile is 199, the mortality is 19.300, or *one* in 52; whilst, in some of the worst town districts, where there is a population to the square mile of 5.108, the mortality is 27.073, or *one* in 37, annually.

But if we compare some parts of the country with others, we find a still more striking disproportion in the relative mortality. Thus, the mortality of all

England is . . .	1 in 45	Birmingham . . .	1 in 37
Anglesea	1 in 62	Sheffield	1 in 33
Isle of Wight. . .	1 in 58	Bristol	1 in 32
London	1 in 39	Manchester (Union)	1 in 30
Leeds	1 in 37	Liverpool (Parish) .	1 in 29

A proof of the unhealthy condition of our large towns is to be found in the low mean duration of life of their inhabitants. For instance, the mean duration of life in Surrey is 45 years; for London, it is 37; and for Liverpool, only 26. It follows that the inhabitants of London, compared with England at large, are exposed to deleterious influences, which cause them to lose *eight* years of their lives; and the inhabitants of Liverpool *nineteen* years.

Another evidence of the greater unhealthiness of towns is afforded by the *comparative* longevity of the inhabitants of the different districts. If, then, we take the districts of Devonshire, Dorset, Wilts, Cornwall, Somerset, Norfolk, Suffolk, Cumberland, Westmoreland, and Northumberland, (except the mining part,) and Lancashire, (north of Morecombe Bay,) and contrast them with the Metropolis, Birmingham, Leeds, Manchester, and Liverpool, we shall have the following result:—

	Total Deaths, 1839-40.	Deaths at 70 and upwards.	Deaths at 70 to every 1000.
Country.	52.204	10.538	202
Towns	71.544	6.457	90
England and Wales.			141

If we take the table of Neison, published in 1845, based on the experience of Benefit Societies, and institute a comparison of the mortality in rural, town, and city districts, we find that of every 100,000 persons at 10 years of age in England and Wales—(members of the Benefit Societies)—half of the whole number will die between 62 and 63 years of age. While

	Years of Age.
in Rural Districts, half the number will die from	68 to 69
in Town Districts, ditto ditto	64 to 65
in City Districts, ditto ditto	61 to 62

From this table, therefore, it appears that the inhabitants of the rural districts live longer by six years; and those of town districts by two years; while the inhabitants of city districts lose one year of the average duration of life. The inhabitants of rural districts, therefore, live 7 years longer than those who inhabit cities.

The following Table exhibits the average number of deaths in some of our larger towns, calculated from the number of deaths in 1840, 1841, and 1842 :—

DEATHS ANNUALLY IN EACH ONE THOUSAND INHABITANTS.

Kidderminster and Halifax .	21	Wigan and Sheffield . . .	27
Acton and Bosford . . .	22	Nottingham and Salford .	28
Tynemouth	23	Bolton and Wolverhampton	28
Bradford, Clifton, and York .	24	Preston	29
Carlisle, Gateshead, & Norwich	25	Hull	30
Newcastle and Leeds . . .	27	Leicester and Bristol . . .	31
Ashton, Oldham, and Bury	27	Manchester	32
Sunderland and Birmingham	27	Liverpool	35

As my object, this evening, is to show the unhealthiness of London, I shall avail myself of the last return of the Registrar General for the quarter ending March 31st. In it we are furnished with certain facts which eminently serve to lay bare its unwholesome and insalubrious state.

In the middle of the year 1841, London contained 1,950,000 inhabitants, and there died during the seven years commencing 1838, and terminating 1844, 342,000 persons, or on an average, 48,857 annually.

There died of every 1000 living, at all ages:

Of Females in London, 23; in the neighbouring counties, 18 to 20
Of Males „ 27; „ „ 19 to 21

There was, therefore, an excess of mortality of females in London of 5 over the healthiest county; and of males, of 8 in every 1000 living. Out of an equal number of males living, there were 3 deaths in London for every 2 in the healthy counties.

Of 1000 boys under five years of age, there die in

Surrey	48
Sussex	50
London	93

Consequently, the mortality of children under five years of age, is twice as great in London as in the adjacent counties, including several towns.

"The excess of deaths in London," says the Registrar General, "is not the result of climate, for the climate differs little from that of the surrounding counties, and some of the London districts are not more unhealthy than many country districts. Take Lewisham, for instance, comprising Blackheath, Sydenham, Eltham, and Lewisham itself. The annual mortality of females was 16, of males 18, in 1000,

The deaths in London registered during the 7 years 1838 to 1844, were	342,000
If the mortality had not been greater than in Lewisham, the deaths in London would have been about	244,128
The excess of deaths in London, therefore, from causes peculiar to it, amounts to	97,872"

Which is within a minute fraction of 14,000 per annum.

I do not believe, however, that this excess of mortality truly represents the deleterious effect which London, in its present dirty and neglected state, exercises upon the health of its inhabitants. I am firmly persuaded that the real mortality of

London is considerably higher than the apparent mortality shown in the returns of the Registrar General, and that it is reduced by many of those persons who have lived in London to adult or mature age, migrating from it to the country, to protract their lives, and die *in* the country. Comparatively few of the middle and upper classes who inhabit London, die *in* London: a fact which may partly explain the appalling difference which will be shown to exist between the relative length of life of the labourer, and of the shopkeepers, and gentry. A considerable proportion of that numerous class of persons who enter London between the ages of 15 and 35, and who serve to recruit its puny, feeble, and stunted population, do not die in London, but when they are attacked by disease, (and more especially by that lingering form of disease, to which the inhabitants of towns are peculiarly exposed, namely, consumption,) and when, consequently, they are unfitted for continued labour, and their avocations, return to their homes in the country, there to terminate with their lives those diseases which, in truth, were caused, or developed, by a residence in the close, impure air of a crowded, ill ventilated, and worse drained city. A great number, also, of those who are born in London, and who become the victims of consumption, leave London in search of health, and die elsewhere. London, therefore, may be not unaptly compared to a regiment of soldiers, comparatively few of whom die while on the roll of the regiment, but are discharged when enfeebled, to return to their homes and die; their places are supplied by young and healthy recruits, who fill up the ranks thinned by climate and exposure.

The returns of the Registrar General of the deaths at all ages, are open, therefore, to many sources of inaccuracy, of which consumption, the most fatal disease between the ages of 15 and 35, is one. We must, then, to arrive at an approximation to the true mortality of London, seek for it in the mortality which occurs at ages which are not open to these disturbing causes. The number of deaths of children under five years of age will afford us the nearest approximation to the truth.

Now the deaths registered in London under five years of age during the seven years, 1838, 1839, 1840, 1841, 1842, 1843, 1844, were	139,593
The deaths, if the mortality had not been higher than in Lewisham, would have been	80,632
The excess of deaths among children in London is	58,961

More than 8,000 children, therefore, have been annually destroyed in London, by unnecessary and preventible causes, during the first seven of the last ten years.

Having thus established the large proportional mortality in towns over that in the country, we have next to inquire whether all parts of towns are equally unhealthy. In the prosecution of this inquiry it has been established, that a greater number of deaths takes place, in proportion to the living, among those inhabiting certain districts of a town, than others. Thus in one of the Reports of the Registrar General, it is stated that the metropolis is divided into three groups of ten districts each, under the title of the healthiest, the medium, and the most unhealthy districts. The result is shown in the following table :—

THE TEN HEALTHIEST DISTRICTS.		THE TEN MEDIUM DISTRICTS.		THE TEN UNHEALTHIEST DISTRICTS.	
With an allowance of square yards to each person.	Deaths.	With an allowance of square yards to each person.	Deaths.	With an allowance of square yards to each person.	Deaths.
202	1 in 49	102	1 in 41	32	1 in 36

The tables of the Registrar-General further prove that the expectation of life in Whitechapel is with females 34.3; males 31.0; whilst in St. George's, Hanover Square, it is for females 39.7; males 37.4; showing a difference in the expectation of life of nearly 6 years in favour of the inhabitants of St. George's, Hanover Square.

Similar tables likewise prove to us that the unhealthy districts of the metropolis have a mortality 66 per cent. higher than the healthy districts. In 25 of the unhealthiest sub-

districts, the mortality is 1 in 33, and in 125 of the healthiest the mortality is only 1 in 56. In some of the rural districts adjoining London, the mortality is as low as 1 in 63, which is the mortality of Stamford Hill, and 1 in 91, which is the mortality of Dulwich.

The following Table, compiled from the supplement to the Report on the sanitary condition of the labouring population, affords us most instructive information concerning the health and mortality in the different districts of the Metropolis. It is calculated from the total number of deaths in the year 1839.

DISTRICT.	Proportion of Deaths to the Population.	Average Age at Death.	DISTRICT.	Proportion of Deaths to the Population.	Average Age at Death.
Greenwich . . .	39	36	St.James, Westminst.	50	26
Camberwell . . .	51	34	East London . . .	36	26
Hackney	56	31	Holborn	36	26
St.George's, Hanov. Square . . .	50	31	Shoreditch . . .	38	26
			City of London . .	50	25
Rotherhithe . . .	41	30	St. John & St. Margaret, Westminster	39	25
St. Olave's. . . .	19	30			
Kensington . . .	51	29	St.James, Clerkenwll.	43	25
Islington	55	29	St.George-in-the-East	36	25
St. Martin's-in-the-Fields.	36	28	St Giles & St. George	36	25
			Strand	41	24
Poplar	47	28	Lambeth	46	24
Marylebone . . .	45	28	St. George, Southwark	39	23
Stepney.	41	28			
St. Mary, Newington	46	28	St. Luke	40	22
St. Pancras . . .	43	27	Bermondsey . . .	42	22
West London . . .	27	27	Bethnal Green . .	41	22
Whitechapel . . .	31	26	St. Saviour . . .	36	21

From this table, therefore, it appears, that while there is only *one* death in every 56 inhabitants in the parish of Hackney, there is *one* death in every 19 inhabiting the district of St. Olave's.

While the average age at death of all who died in 1839 in Greenwich was 36 years, the average age at death in St. Saviour's was as low as 21 years.

As the existence of Greenwich Hospital, which contains a great number of old men, whose deaths, at advanced life, will necessarily increase the average age at death of all who

die in the district, Camberwell may more fairly be selected as the district in which the whole of the inhabitants attain the greatest longevity (as deduced from the average age at death). The whole of the inhabitants, therefore, of St. Saviour, as compared with those of Camberwell, lose 13 years of their lives.

To use the words of the Registrar General, "the poison which causes death is not a gas, but a sort of atmosphere of organic particles, undergoing incessant transformations; perhaps, like malaria, not odorous, although evolved at the same time as putrid smells; suspended like dust, an aroma, vesicular water in the air, but invisible. If it were for a moment to become visible, and the eye could see it from a central eminence, such as St. Paul's, the disease-mist would be found to lie dimly over Eltham, Dulwich, Norwood, Clapham, Battersea, Hampstead, and Hackney; growing thicker round Newington, Lambeth, Marylebone, Pancras, Stepney; dark over Westminster, Rotherhithe, Bermondsey, Southwark; and black over Whitechapel and the City of London without the walls. The district of St. Giles' would be a dark spot in the midst of surrounding districts; St. George, Hanover-square, and St. James in Westminster, would be lighter than Marylebone and St. Martin's-in-the-Fields; part of the City of London within the walls would present a deep contrast to the City without the walls." (See Appendix A.)

Statistical inquiries further prove, that the pestilential agents which cause the increased mortality in towns, do not altogether confine their effects to the localities in which they are generated, but extend their influences to the best parts of the districts, and thus affect the highest as well as the lowest classes of the community. Thus in

	AVERAGE AGE AT DEATH.			
	Gentry, Professional Persons.	Tradesmen.	Labourers.	General Average.
Four Metropolitan Unions	44	28	22	25
Liverpool	35	22	15	17
Bethnal Green	45	26	16	22

While we know that in the healthy parts of the metropolis the average, or mean age at death among the gentry, is much higher. The average age at death of the gentry in St. Mary, Newington, is 50.

But if we compare the metropolis with Preston, we shall find that the average age at death, including children, is —

In the class of	Gentlemen	in the	Metropolis .	44	in Preston .	47
„ „	Tradesmen	„	„ .	25	„ .	32
„ „	Labourers	„	„ .	22	„ .	18

The deleterious agents which impair the health, and increase the mortality in towns, although they affect all classes of the population, nevertheless, peculiarly exert their fatal influence on some classes more than on others. Children under five years of age are especially susceptible to the influences which destroy life in towns.

The great difference between infantile mortality in town and country districts may be illustrated in this way; of every 1,000 born, 221 die under 5 years of age in our agricultural districts, while the great, the much greater, number of 385 die annually under the same age in our densely populated towns; in some of these, the mortality is so great, as in Manchester, that one-half are said to die under 5 years of age. It is a lamentable fact, that one-quarter of the children born in England die before they reach the 5th year of their age.

The influence of the poisonous emanations which hover over, and infect our towns, is chiefly exerted upon the labouring population, and next upon the class of tradesmen.

Thus, if we compare the average age at death of the gentry, the tradesmen, and the artisans in London, we find that while the gentry live to 44 years of age, the tradesmen live only to 23, and the artisans to 22 years of age.* But if we except the deaths of those below 21, we find that while the

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* Calculated from the deaths in 1839.

gentry die at 61, the tradesmen die at 50, and the artisans at 49 years of age.

The gentry of London lose 1 year of their lives, the tradesmen 13 years, and the artisans 16 years. If we take the deaths above 21 years of age, the gentry lose 3 years of their lives, the tradesmen 12 years, and the artisans 13 years.

The following table exhibits the average age at death of the different classes of the population of London, in districts, calculated from the mortuary returns of 1839:—

District.	Average Age at Death, including Children.			Years' Average Premature Loss of Life by Deaths at all ages.			Average Age at Death of all who Died above 21 Years.			Years' Average Premature Loss of Life by Deaths above Age of 21.		
	Gentry.	Tradesmen.	Artisans, &c.	Gentry.	Tradesmen.	Artisans, &c.	Gentry.	Tradesmen.	Artisans, &c.	Gentry.	Tradesmen.	Artisans, &c.
Greenwich	48	31	36	...	8	3	62	54	56	...	8	6
Camberwell	38	28	26	1	11	13	58	54	51	4	8	11
Hackney	47	29	27	...	10	12	61	52	55	1	10	7
St. George's, Hanover-square..	45	29	27	...	10	12	59	50	47	2	12	15
Rotherhithe	49	40	40	...	...	...	57	50	51	5	12	11
St. Olave's	...	25	30	...	14	9	64	48	43	...	14	19
Kensington	45	30	24	...	9	15	60	50	53	2	12	9
Islington	42	26	19	...	13	20	61	50	47	1	12	15
St. Martin-in-the-Fields	46	24	26	...	15	13	57	45	48	3	17	14
Poplar	43	26	25	...	13	14	61	51	53	1	11	9
Marylebone	46	27	23	...	12	16	59	51	48	3	11	14
Stepney	56	31	23	...	8	16	65	53	48	...	9	14
St. Mary, Newington	50	26	22	...	13	17	62	50	52	...	12	10
St. Pancras	45	27	22	...	12	17	61	50	47	1	12	15
West London	38	22	22	1	17	17	58	49	46	4	13	16
Whitechapel	47	26	25	...	13	14	58	50	48	4	12	14
St. James, Westminster	42	26	21	...	13	18	57	51	46	5	11	16
East London	50	23	21	...	16	18	63	53	51	...	9	11
Holborn	47	24	19	...	15	20	58	52	50	4	10	12
Shoreditch	47	23	19	...	16	20	65	47	51	...	15	11
City of London	43	23	22	...	16	17	63	48	50	...	14	12
St. John and St. Margaret, Westminster	42	20	21	...	19	18	55	46	48	7	16	14
St. James, Clerkenwell	46	23	19	...	16	20	60	49	50	2	13	12
St. George in the East	54	23	18	...	16	12	63	49	46	...	13	16
St. Giles and St. George	40	26	17	...	13	22	60	52	51	2	10	11
Strand	40	25	21	...	14	18	59	51	48	3	11	14
Lambeth	37	21	19	2	18	20	58	50	49	4	12	13
St. George, Southwark	45	30	20	...	9	19	61	54	53	1	8	9
St. Luke	38	25	20	1	14	19	56	49	49	6	13	13
Bermondsey	20	25	18	19	14	21	51	48	51	11	14	11
Bethnal Green	46	24	18	...	15	21	61	53	51	1	9	11
St. Saviour's	47	26	22	...	13	17	52	52	45	10	10	17
Average	44	25	22	1	13	16	60	51	49	3	12	13

This frightful decrement in the scale of existence of the operatives, labourers, and tradesmen of the Metropolis and our large towns, is further established by the fact, that if a comparison be instituted between the inhabitants of St. Giles's and St. George's, Bloomsbury, it is found that those who reside in the squares and open streets of the comparatively healthy district of St. George's, live, on an average, at least 40 years; while the average duration of life among the labouring classes, who chiefly reside in St. Giles's, is 17 years! being 23 years less than the average among the gentry and their families, and 9 years less than among tradesmen and their families. In Shoreditch, again, the average age at death is 19 years; and the loss of life, as compared with the gentry, amounts to 28 years. The difference in favour of tradesmen is 4 years. In Bethnal Green, as has just been shown, the difference between the average age at death of the gentry at 45, and of the labourer at 16, is 29 years. In some districts, as St. Olave's and St. Martin-in-the-Fields, the average age at death is higher among the operative class than among tradesmen.*

Having thus successively proved that there is an excessive mortality in town over country districts, in some towns over others, and some parts of the same town over other parts, and pointed out the classes upon which the mortality chiefly falls, our next step is to determine what are the causes which produce this excessive mortality.

Now, tables have been constructed which show, at a glance, the diseases which chiefly produce this great excess of mortality in towns over county districts, and we find them to be of that class which derive their true origin, in a great measure, from atmospheric impurity. The inquiry being thus still further narrowed, I shall, after some additional statistical details, endeavour to lay before you the causes of atmospheric impurity.

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* In the Appendix B, it is shown that the mean age at death cannot be fully relied on as the basis of sanitary statistics.

The influence of certain diseases in the production of an excessive mortality in towns over country districts may be illustrated by the following table:—

Of 1,000,000 living there are deaths from	In the Country.	In the Towns.	Total Excess.
,, ,, Small-pox	500	1,000	500
,, ,, Measles	350	900	550
,, ,, Scarlet-fever	500	1,000	500
,, ,, Typhus	1,000	1,250	250
,, ,, Epidemic and contagious disorders together . .	3,400	6,000	2,600
,, ,, Diseases of Infants, Teething, Convulsions, Water in the Head	1,300	3,500	2,200
,, ,, Scrofulous Diseases and Consumption	3,800	4,600	800

The last column exhibits the waste of life which occurs in towns from diseases which are preventible. There is a total excess of deaths of 5,500 in the million, and consequently a waste of 22,000 lives in the 4,000,000 inhabiting our large towns.

The influence of epidemic diseases, in producing a high rate of mortality in towns, may be further illustrated by the fact, that while the mortality in towns is chiefly swelled by the premature deaths which occur among the classes of tradesmen and artisans, these last are likewise found to suffer much more than the class of gentry from epidemic diseases. Thus, in London, the proportion of deaths from epidemic diseases among the gentry is 9.3 per cent.; among tradesmen 18.6 per cent.; and among artisans 21.5 per cent.; but in some districts, where the proportion of deaths from epidemic diseases is greatest among tradesmen and artisans, the gentry either do not suffer from these diseases at all, or to a very limited extent. Thus, in the districts of St. Olave's, Whitechapel, East London, St. George-in-the-East, and Bermondsey, the mortality from epidemic diseases in 1839 fell *entirely* on the classes of tradesmen and artisans. The proportions per cent. being:—

DISTRICTS.	In the Class of Tradesmen.	In the Class of Artisans.
St. Olave's	23.8	13.1
Whitechapel	15.4	18.9
East London	25.5	22.1
St. George-in-the-East . .	21.0	19.9
Bermondsey	12.8	25.0

The proportionate mortality from epidemic diseases, in the following districts, is likewise very great, though not so high as in the above districts. Thus, the mortality per cent. in 1839 was—

IN THE DISTRICT OF	In the Class of Gentry.	In the Class of Tradesmen.	In the Class of Artisans.
St. Martin-in-the-Fields	7.4	20.6	27.2
Stepney	4.1	17.2	21.3
St. Mary, Newington .	6.5	16.6	21.8
St. Pancras	7.5	17.0	22.2
Holborn	6.7	24.3	25.5
Bethnal Green . . .	8.0	22.8	27.5

The total number of deaths in England and Wales during the year 1841 was 343,847, or somewhat less than 1,000 a-day, which is at the rate of one death in 46 inhabitants. But if instead of one death in 46 inhabitants there had been but one death in every 50 inhabitants, or 2 per cent., not less than 25,407 lives would have been saved. Now, it is agreed by all who have paid any attention to this subject, that, by proper sanitary measures, such a state of health among the community at large might be insured, that the mortality should not exceed that proportion. If the sanitary state of the entire country could be raised to the present condition of the most healthy counties, so that instead of one death in 46 inhabitants, there should be only one death in 54, there would be an annual saving of not less than 49,349 lives, or about one-seventh of the whole number of deaths! Dr. Guy states—"At first sight it may appear extravagant to represent such an improvement of our

sanitary condition as possible ; but when it is recollected that, on the one hand, even our most agricultural counties have *not* yet attained to their *best* sanitary state, and that our large towns have been hitherto almost entirely neglected, and admit of immense improvement, the attainment for the whole country of a sanitary condition represented by one death in 54 inhabitants is at least within the bounds of possibility."

I think it right here to state to you, that the condition of the agricultural labourers, with regard to remediable causes of disease, is not that perfect state which is so generally assumed, and so improperly admitted, by many writers on sanitary measures. In truth, the cottages of the labourers are often ill-ventilated, and almost always badly drained and sewered, and consequently more or less surrounded by impure and foul emanations. The causes of fever thus brought into existence no more exempt the agriculturalist from their effects than the townsman, a fact sufficiently proved by the comparatively small difference between the actual mortality in a given number of deaths, resulting from fever in towns and in the country. It is true, that in the small towns and villages in country districts the pestilential exhalations are diluted to a much greater extent by fresh air, and thus become less noxious and destructive. Still, they do exist, and deteriorate the health, and increase the mortality of the country population. Far, therefore, from considering such an improvement of our sanitary condition as only within the bounds of possibility, it appears to me that an efficient system of sanitary precautions, duly carried out, would produce a greater saving of life than is here contemplated.

The United Kingdom contains about 28,000,000 of inhabitants, and it is calculated that the annual waste of life which takes place is upwards of 60,000; this enormous mass of human beings, whose lives are thus squandered away in reckless waste and wantonness, is equal to the whole population of Westmoreland or Huntingdon. Did the depopulation of the country to this extent take place locally in place of generally, doubtless the frightful evils which produce such a mortality would have been remedied long ago.

That this estimate is below the truth, and not above it, is proved from the fact, that *in England*, from zymotic, or epidemic, endemic and contagious diseases; namely, small-pox, measles, scarlatina, hooping cough, croup, thrush, diarrhœa, dysentery, cholera, influenza, ague, remittent fever, typhus, and erysipelas,* the deaths were—

In 1838	67,877
1839	65,343
1840	76,064
1841	63,148
1842	64,295

Now these diseases are in a great measure, if not wholly preventible; and it is not too much to assert, that the lives of at least two-thirds of these numbers might have been saved by proper sanitary regulations. This calculation leaves altogether untouched the number of persons who die from these causes in Scotland and Ireland. Certainly, at least 35,000 persons die annually in England and Wales, from causes which are well known to be preventible.

The cases of unnecessary sickness, taking the number of unnecessary deaths at 35,000, amounts to 980,000; and if the whole kingdom be included, then the waste of life amounts to 60,000, and the cases of sickness which could be prevented reach to the enormous number of 1,680,000.

The neglect of sanitary measures in England and Wales alone costs the lives of 137 persons every day.

Now, about two millions of inhabitants are contained in the metropolis, or about one-eighth of the population of England and Wales, and about one-fourteenth of the United Kingdom. Of this number, according to the Registrar-General's statement for 1844—50,423 die annually, or 1 in 39. But if the rate of mortality were 1 in 50, in place of 1 in 39, as it is in several large towns of England, and in the healthier parts of the metropolis itself, there would be an annual saving of 10,278 lives.

In the metropolis, there are about 266 deaths every week,

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* Syphilis and hydrophobia are omitted in this list.

nearly 38 deaths a-day, or considerably more than one every hour, *over and above* what ought to happen in the common course of nature. Now, it has been calculated that for every death which takes place, there are 28 cases of sickness which do not end fatally; we have therefore 387,296 cases of sickness occurring in the metropolis every year, which are unnecessary and preventible. 13,832 lives could be saved—more than a third of a million of cases of sickness could be prevented!

One-fifth of the total waste of health and life which takes place in the United Kingdom occurs in the Metropolis.

Of the 49,089 persons who died in London in the year 1846, 22,275 died before they reached the 15th year of their age, and only 2,241 of old age, which the illustrious Boerhaave stated to be the only disease natural to man.

The value set upon human life has always been the test by which to measure the progress of civilization. I trust it is scarcely necessary for me to demonstrate that human life is valuable, or that length of life is desirable. If the average age at which we die is really so premature, and so far removed from three-score years and ten, which is said to be the natural duration of human life—length of life must surely be desirable. It indicates with accuracy the state of health enjoyed, without which, life itself becomes a burden, in place of a blessing:—to live long, and to live in constant suffering, God has kindly made incompatible. Length of life must be desirable, because the term which is added to our mean age at death, (occurring as that does in the metropolis at 29 years of age, the spring or summer of our life,) is an addition to that portion of life which at once affords us the greatest happiness, and means of benefiting society and ourselves.

Dr. Southwood Smith has well observed, that "every year by which the term of human life is extended, a year is really added to the period of mature age, the period of life when the organs of the body have attained their full growth, and put forth their full strength; when the physical organization has acquired its utmost perfection; when the senses, the feelings, the emotions, the passions, the affections are in the highest

degree acute, intense, and varied;—when the intellectual faculties, completely unfolded and developed, carry on their operations with the greatest vigour, soundness and continuity; in a word, when the individual is capable of communicating, as well as of receiving, the largest amount of the highest kind of happiness."

I greatly fear, however, that to the low estimate which is entertained of the value of human life, must be ascribed the apathy and indifference with which the rich and middle classes regard the sufferings and frightful devastation of human life, which are proved to be constantly going on. How otherwise can we reconcile to our minds the facts, that a Government Commission has fully laid bare, in all its loathsome nakedness, the hideous condition of such multitudes of our fellow-beings, and the indifference which still prevails upon the subject.

The parish authorities, with a few honourable exceptions, such as Whitechapel, Hackney, Poplar, and St. George's, Southwark, have proved themselves hostile to any change in the present management of things. While the poor feel and deplore the lamentable state of filth and wretchedness in which they are compelled to dwell, those *in authority* over them, who know their condition, do next to nothing to assist them in their efforts to improve that condition.

Having proved, from indisputable statistical details, that a great waste of human life is constantly going on in London, and in all our large towns,—and when waste of life is mentioned, it must be borne in mind, that it includes and embraces the cost of the unnecessary sickness of 1,680,000 persons; the unnecessary widowhood of 27,000; and the unnecessary orphanage of 100,000; the funeral expenses of 60,000; and the cost of the additional births, which are found always to accompany a high rate of mortality;*—the loss of productive

* See the works of MM. Mallet and Quetelet. In Manchester, where one twenty-eighth of the whole population is annually swept away, the registered births amount to 1 in 26 of the population. In the county of Rutland, where the proportion of deaths is 1 in 52 of the population, the proportion of births is 1 in 33. In Marylebone, where

labour, as well as the unnecessary charges on the poor-rates; on hospitals, dispensaries and asylums, and on public and private charities, which follow in the train of this sacrifice of life. I will now endeavour to point out the agencies which chiefly tend to produce this excessive mortality.

The causes of the high mortality of towns are traceable to the density of the population, to the want of ventilation and consequent impurity of the air; to the defective state of the paving, drainage and sewage; to the filthy state of the dwellings of the poor and of their immediate neighbourhood; to the *concentration* of unhealthy and putrescent emanations from narrow streets, courts and alleys; to the crowded and unhealthy state of the workshops, and to the injurious occupations which are carried on in them.

It is evident that after rain has fallen, all that portion which has been poured on the roofs of houses will drip down and soak into the ground, unless spouts, gutters, drains, and sewers are provided to carry it off. It is also evident, that all the rain which falls upon the ground must soak into it, unless it be paved, guttered, drained, and sewered.

Now, in such cases, the rain-water having soaked into the ground will settle into the soil, sap the foundations of the walls, render the floors damp, and fill the air with vapour. But besides the rain which falls, we daily bring into our streets, and houses, spring, well, and river-water, and animal and vegetable matters for food, and other purposes, of which matters a very large amount, and ultimately the whole, or nearly so, becomes refuse, and *must* be got rid off. Now, unless there be paving and drainage, with a good road-way impervious to moisture, not only the rain, but all the water used for washing, cooking, and manufacturing, however filthy it may have become, and all the refuse and excrementitious matter of every kind which is continually accumulating, (except so far as it may be removed by the offensive and

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the excess of deaths above the standard of Camberwell is 565, the excess of births above the same standard is 801. In Shoreditch the excess of deaths is 527, the excess of births, 1093. The excess of deaths in the whole metropolis above the standard of Camberwell, is 6,947, the excess of births, 10,885.

degrading process of manual labour,) must be left to rot on the ground, and sink into the soil, liable to be stirred up anew, and brought to the surface, by every shower of rain, and ready to yield to the air warmed by each sun, and to every wind that blows, vapour charged with the seeds of disease and death.

The most important agents, therefore, in producing a high rate of mortality in towns is the want of paving, inefficient street cleansing, and defective drainage and sewage. Now, what is the state of London with regard to paving, street-cleansing, drainage, and sewage?

It is impossible to read the accounts contained in the Reports of the Commissioners of the Health of Towns, of the filthy and horrible state in which the houses and streets in the poorer localities are represented to exist, without being struck with amazement,—that in a town, professing to be the centre of civilization, and the mightiest in the world,—such abominations as everywhere present themselves should be allowed to exist even for a day. Yet, these reports are confirmed by the replies which have been returned to the inquiries made by the Health of London Association, and distributed all over London within the last few months. In these replies, received from every quarter of London, the filthiness of the metropolis is laid bare, and the state of the sewerage and drainage is declared to be most disgracefully insufficient. There are thousands and thousands of houses without drains, and multitudes of streets without sewers. In many parts of St. George's-in-the-East there is no drainage, and the kitchens, in some places, after heavy rains are stated to be several inches under water; which, when it recedes, leaves an accumulation of filth and dirt of the worst description.

In the district of Hoxton and the parish of Bethnal-green, there are but few streets and houses having either sewers or drains.

Dr. Southwood Smith relates to us that—

"Punderson's Garden is a long narrow street, in the centre of which is an open rush-gutter, in which filth of every kind is allowed to accu-

mulate and putrefy. A mud bank, on each side, commonly keeps the contents of this gutter in their situation; but sometimes, and especially in wet weather, the gutter overflows, its contents are then poured into the neighbouring houses, and the street is rendered nearly impassable. The privies are close upon the foot-path of the street, being separated from it only by a paling of wood: the street is wholly without drainage of any kind. Fever constantly breaks out in it, and extends from house to house. It has lately been very prevalent here, and we have had several fatal cases from it in the London Fever Hospital."

On several occasions lately I have visited this locality, as well in wet, as in dry weather. The only change which has been made in it, during the last twenty-three years, is declared by an old inhabitant to have been for the worse. In place of the gutter in the centre of the roadway, there is now a road, and a gutter on either side. These gutters are almost always full, even after long-continued dry weather, because the inhabitants have no where else to throw their refuse water. In wet weather the road is nearly impassable; the soil from the privies soaks into the gutters, and the whole refuse from a large pig-stye is every morning swept into it. As if to concentrate the evil still further, there are large cow-sheds and pig-styes close by, from which very nauseous odours were given off. It is right, however, that I should state, that Punderson's Garden is by no means worthy of the bad eminence which has been thrust upon it; I have seen in nearly every part of the parish of Bethnal Green places in a much worse condition than Punderson's Garden.

Dr. Southwood Smith likewise gives us a description of Lamb's Fields:—

"The open area called Lamb's Fields is about 700 feet in length and 300 feet in breadth; of this space about 300 feet are constantly covered with stagnant water, winter and summer. In this part thus submerged, there is always a quantity of putrefying animal and vegetable matter, the odour of which, at the present moment, is most offensive. An open filthy ditch encircles this place, which at the western extremity is from eight to ten feet wide; into this part of the ditch, the privies of all the houses of a street called North Street open. These privies are completely uncovered, and the soil from them is allowed to accumulate in the open ditch. Nothing can be conceived more disgusting

than the appearance of this ditch for an extent of from 300 to 400 feet. The odour of the effluvia from it is, at this moment, most offensive."

"Lamb's Fields is the fruitful source of fever to the houses which immediately surround it, and to the small streets which branch from it. Particular houses were pointed out to me, from which entire families have been swept away, and from several of the streets fever is never absent."

"A part of this place has been improved since this description was written, by the cuttings of the Eastern Counties Railway, which passes through it; but the offensive ditch, with the exposed conveniences emptying into it, remain just the same. I know that no verbal description of these places can convey any conception of their disgusting and poisonous condition; they must be seen to be at all understood; and when seen, every one involuntarily exclaims, 'Can such a state of things exist in a country, that has made any progress in civilization!' These places had remained in this state many years, and no one had made any attempt to improve them; and now, after an account of their condition has been published to the world upwards of five years, they are allowed to remain just the same."

To satisfy myself as to the accuracy of the above description, in company with my friend Mr. Taylor, the parochial medical officer, I visited this spot, after long-continued hot weather. In place of about 300 square feet being covered with putrid water, I found that all the space enclosed between a boarding on either side of the Eastern Counties Railway, and extending from part of arch No. 91, and the half of arch No. 92, up to the end of arch No. 98, a distance of about 230 or 250 feet, and from forty to sixty feet in width, was one enormous ditch or stagnant lake of thickened putrefying matter; in this Pandora's box dead cats and dogs were profusely scattered, exhibiting every stage of disgusting decomposition. Leading into this lake was a foul streamlet, very slowly flowing, and from it another, which widened and expanded into a large ditch before it disappeared in the open end of a sewer. Bubbles of carburetted, and sulphuretted-hydrogen gas, and every pestilential exhalation resulting from putrefaction, were being most abundantly given off from the ditches and the lake. The ripples on the surface of water occasioned by a shower of rain are not more numerous than were those produced by the bursting of the

bubbles of these pestilential gases, which were about to produce disease and death. The construction of the railway has diminished the extent of this lake, but it has *concentrated* the evil. Now the concentration of such foci of disease has been proved to be deleterious in a geometrically increasing ratio. What, therefore, must be the effect of this lake of putrescency on the health and lives of those who shall inhabit the houses that are rapidly springing up all around it? A row of 22 new houses of two flats, with cesspools in front, are being built parallel to, and within 10 feet of this most disgusting and degrading scene, which is an abomination dangerous even to the casual inspector.

The filthy ditch at the western end, on the south side of the railway, in a straight line with arch No. 81, was in very nearly, if not precisely, the same state as when it was described by Dr. Southwood Smith nine years ago. A similar ditch, upon a smaller scale, extends in a northern line from arch No. 68.

Between Mape-street and Hague-street, Bethnal-green, there is a large and deep hollow, in the shape of an irregular triangle, with the sides measuring respectively about 130, 130, and 100 feet. In wet weather this is a sort of pond; into it are thrown, at all times, the contents of the fish baskets, the heads and intestines of fish, and every possible kind of animal and vegetable refuse. In the hot and dry weather, in which I visited it, the surface had become exsiccated, and the nature of the filthy soil on which I trod was not readily perceived by the eye, but the sense of smell detected, in a concentrated form, the essence of putrefying odours, and the stomach heaved with nausea. At one end of this triangle, and on a level with its lowest surface, are two rows of houses, with open privies, and the soil oozing into a little ditch in the hollow.

Derbyshire-street runs parallel with Bethnal-green-road; the one side, that nearest the road, is higher than the opposite. For the length of about 260 feet there is a gutter and deep hollow, filled with stagnant and putrefying filthy fluid. When wet weather comes, this fluid filth is washed into the

houses on the opposite side of the street, and inundates them, leaving, when it subsides, a compost of mud and filth. The continuation of Derbyshire-street to the east, called Alfred-row, has on its north side the privies bordering the foot-path. These are broken down, and the soil oozes from them, and finds a resting-place in the gutter by the side. Pleasant Place is situate opposite to the Jews' Burying Ground; it consists of three sides of a square, with a small square in the centre of it. This central part is chiefly made up of swine pens, and yards in which dung heaps are formed. On the left side, a filthy ditch runs in front of the small houses, for a hundred feet. The other two sides were in a most foul and filthy state. The vacant space between the ditch and the central square was filled with heaps of manure. The whole of the surrounding neighbourhood abounds in swine pens and pig-styes, and is most disgustingly dirty. The Guardian of the Poor, who accompanied me, confessed that the place was unfit to live in, and that cleansing was utterly neglected.

There are five arches on the left side of the terminus of the Eastern Counties Railway; two are blocked up. One, the third, forming a covered way, by two arches being placed at right angles with each other, belongs to the parish of Bethnal-green, and is made use of by the public to deposit all sorts of garbage, filth, ordure, and animal and vegetable refuse; the odour of this place is most disgusting. The fifth arch is a miniature resemblance of the putrid lake in Lamb's Fields, likewise belonging to the Eastern Counties Railway. Let not the public abuse and condemn the poor for the filthy and wretched state of their dwellings, and of their immediate neighbourhood. Here we have a Company, possessing immense resources, who tolerate, and are morally (and they ought to be legally) responsible for, a state of things surpassing every conception of the mind as a concentration of filth and impurity.

At the back of St. Peter's church, towards the Bethnal-Green road, there is a very large pond, with a very small, narrow, shallow outlet, by which the surplus water escapes into a sewer at a considerable distance from it. This stagnant

pond receives all kinds of impurities, and dead animals there find a resting-place. When I last saw this pond it was most abundantly emitting the gases which arise from the decomposition of animal and vegetable matter. The air was infected, and could not be breathed without producing nausea. Verily it was an essence of filth, most disgusting to behold.

If the condition of some parts of London, with regard to sewerage, be, as I have just now, from personal inspection, described, it will readily be understood that street cleansing must be in a lamentably defective state. As a general rule, while the first class streets are pretty regularly (nominally) cleansed once a week, the second class streets are very generally cleansed once a fortnight, the third class once a month, and the worst class never; though the worst class, for the very reason that they are the worst, ought to be cleansed daily. The courts and alleys are seldom, sometimes never, cleansed. There are multitudes of courts and alleys that have never had a scavenger within them. Punderson's Gardens are cleansed about once in two or three years. There are some parts of London where I have walked for hours with liquid putrefying filth in every kennel and hollow,—where the odour was that of one perpetual sewer or cesspool, and where squalor and wretchedness were visible without variety.

As an instance of the manner in which houses are built, even now-a-days, for the habitation of the poor, and as an exemplification of their condition, let me describe to you Newton's Rents, close by the Jolly Sailor, entering from the Back-Lane, St. George's in the East, as I found it on inspection.

Newton's Rents constitutes a court, with six houses on either side. They were built two years ago, at a cost of £100. They are held of the manor of Stepney, and are each let for one shilling a week. The houses consist of *one* room. The rooms on the right side are bounded by a dead wall, and have consequently no back opening whatever. There is a door and window in front, and a projection for a fire-place at the side. The rooms on the left side have the advantage of about two feet of back-yard by the breadth of the house, which is about nine feet square, and eight feet high. At one

end of each of these six back-yards are open privies; at the other end is a dust-bin. At the further end of this court is a large dust-bin, filled with all sorts of garbage, filth, and refuse. On the right side is a most filthy double, open privy, in a state of decay, with ordure strewed all around. On the left, are two open privies, in so beastly a state, that they are utterly unfit for use. The court, which is about ten feet wide, has a grating in the centre, leading to a drain, which is always stopped up; there is, consequently, in dry weather, a little lake of most putrid mud and fluid filth; and in wet weather the court is a foul marsh. The scavenger never enters this court, as it is private property; and the inhabitants never attempt to cleanse it, because it is impossible to keep it clean. There is no water laid on to this court; and to my inquiries, as to how they obtained water, it was replied, that they "begged, borrowed, or stole it." "God knows how they got it!" The nearest place from which they could procure it was the Thames, or the pump half a mile off. Ten of these houses were inhabited, five on either side. They contained respectively, 4, 4, 4; 3, 2, and 4; 3, 3, 4 and 5 persons.

In the third room, on the right hand, there lived two married men and two married women. It is impossible to conceive the debasement and degradation presented to my view. These houses, built but two years ago, had none of the conveniences of civilized life more than are to be found in the earth-holes or kraals of the Caffres; and the inhabitants seemed so dead to every feeling of decency, that they did not conceal those remains which the instinct of animals teaches them should be covered up and put out of sight.

It would surely be a useless task to distress your feelings by relating to you the innumerable instances in which such a horrible condition of things exists in and around London. I know that some may deny that such things can be; but they have only resolutely to plunge into some of the poorer and more densely populated districts of London to find, by personal examination, that it is scarcely possible to convey to a mixed audience anything like a just and true idea of the

filthy abominations and degrading scenes which meet the eyes of those who inspect them.

As an instance of one of the nuisances existing in London, I may refer to a nightman's yard in Tyssen-street, Church-street, Shoreditch. In passing through this wretched quarter of London, where destitution and misery are only equalled by the intense filthiness which is painfully and perpetually present, summer and winter, I stumbled on this revolting spectacle. Mountains of filth, dust, dirt, and ashes, mixed with decaying animal and vegetable matter and manure, were classified and piled up as high as the houses, and covered a very large space of ground. The continual additions which are daily made to this enormous accumulation, and the sifting and sorting of it, cause the loose particles on the surface to be wafted by each wind over this wretched locality, to be deposited in the streets and houses, and inhaled by the inhabitants. In Edinburgh all this refuse is daily removed three miles from the outskirts of the town, and the sale of it supplies the Municipal Body with funds not only sufficient for the perfect cleansing of the town, but affords them a profit of several thousands of pounds sterling. (See Appendix, C.)

On the western side of Spitalfields workhouse, and entered from a street called Queen-street, is a nightman's yard, on a smaller scale than that just described. A heap of dung, and refuse of every description, about the size of a pretty large house, lies piled to the left of the yard; to the right, is an artificial pond, into which the contents of cesspools are thrown. The contents are allowed to desiccate in the open air; and they are frequently stirred for that purpose. The odour which was given off when the contents were raked up, to give me an assurance that there was nothing so very bad in the alleged nuisance, drove me from the place with the utmost speed I was master of. On two sides of this horrid collection of excremental matter, was a patent manure manufactory. To the right in this yard, was a large accumulation of dung, &c.; but, to the left, there was an extensive layer of a compost of blood, ashes, and nitric acid, which gave out the most horrid, offensive, and disgusting concentration of

putrescent odours it has ever been my lot to be the victim of. The whole place presented a most foul and filthy aspect, and an example of the enormous outrages which are perpetrated in London against society. It is a curious fact, that the parties who had charge of these two premises were each dead to the foulness of their own most pestilential nuisances. The nightman's servant accused the premises of the manure manufacturer as the source of perpetual foul smells, but thought his yard free from any particular cause of complaint; while the servant of the patent manure manufacturer diligently and earnestly asserted the perfect freedom of his master's yard from foul exhalations; but considered that the raking up of the drying night-soil, on the other side of the wall, was "quite awful, and enough to kill anybody."

Besides the total absence of paving, drainage, and sewage in many parts of London, the state of those drains and sewers which do exist is, in many respects, most imperfect. Thus, in several places there is only open, and surface drainage, allowing pestilential effluvia freely to rise into the atmosphere.

At Rotherhithe there is an open ditch, which has given rise to many cases of typhus fever; and there are also uncovered drains, which receive the sewage of thickly-populated neighbourhoods. At Poplar, the main sewer is partly uncovered, and is called the Black Ditch. In the district of the Tower Hamlets Commission of Sewers, there were within the last few months upwards of 10,000 feet of open sewers, many of which were in the crowded neighbourhoods of Mile-end New-town, and Bethnal-green.

The influence of these uncovered sewers in producing disease may be imagined from the fact, that on an analysis by Mr. Phillips, the Government chemist, of the sewer-water of Edinburgh, twenty cubic inches and upwards of deadly sulphuretted hydrogen gas were found to be contained in every gallon.

The covered drains are often made with insufficient fall, or declivity, and so become only extended, or elongated cess-pools, contaminating the soil around them, and the atmo-

sphere above them; as is continually proved to us, when the drains require to be opened to remove solid obstructions.

At a late meeting of The Health of Towns Association, it was stated that in the sewers under the management of the Westminster Commissioner, there was always deposited a mass of fœtid matter amounting to two millions of pounds weight.

There are many places in which the sewers are untrapped, and so freely permit the escape of their noxious and pestilential vapours, which diffuse themselves, and carry the seeds of malignant fever into the best ventilated squares and streets. There are vast numbers of houses which could have, and yet have, no communication with the common sewer. The sewers are often constructed on improper principles, and with an utter disregard to any general plan.

But even supposing that all the houses had drains, and all the streets sewers, and that they had been properly constructed, so that they had the most approved form, diameter, and fall; still they would be *in a great measure* useless, because they could not answer the purpose they were intended for, unless supplied with water: without a sufficient supply of water, to keep up a constant current flowing through a drain, the drain itself becomes positively injurious, generating and diffusing the very poison it was intended to prevent and remove. Nevertheless, except the rain which falls from heaven, there is never any effective means in operation by which these conduits can be scoured, or the stagnation of their contents prevented. The water monopolies of London, therefore, render abortive one of the great present existing means of relief from the causes of sickness and mortality. Last year, there is reason to believe that the very heavy showers of rain which providentially fell, and scoured the sewers, saved the metropolis from much disease. Let us, however, before entering upon the results of inefficient sewage and drainage, consider some of the facts with regard to the practical management of the sewers.

The sewers are managed by no less than seven different Bodies, who are called Commissioners, the qualification for which office is made to depend on anything whatever except

a knowledge of the matter in question. These commissioners are irresponsible: their accounts are not open to the public, and the right of the ratepayers to inspect the accounts is not admitted; they are governed by no uniform plan, or rules, but act entirely independently of one another; so that to obey the law in the Tower Hamlets is to infringe it in Finsbury, and *vice versâ*. Moreover, their levels are all different, and are founded on no common principle, or comprehensive survey.

Perhaps one of the most important results brought to light by the inquiry of her Majesty's Commissioners is, the waste of the public money. Thus Mr. Butler Williams,* civil engineer, states, that

"In the Westminster district upwards of forty miles of covered sewers have been built within the last ten years; that the whole of these sewers are faulty both in form and construction; that the *difference* of expense between the construction of the upright-sided sewers, with man-holes (the form adopted in the Westminster district), and the egg-shaped, or arched sewers, with flushing apparatus (the improved form adopted in the Finsbury district), is about 1,800*l.* per mile; and that by the adoption of the former, instead of the latter, by the Westminster Commissioners of Sewers, there has been a positive loss of 66,669*l.* 15*s.*"

Mr. John Leslie gives a history of King's College Scholars' Pond Sewer. The Commissioners having required the opinion of Mr. John Rennie, civil engineer, he reported to them that "it was not only laid down in so irregular a direction, but so imperfectly executed, in such bad repair, and had so bad an outfall into the Thames, that it would only be wasting money to attempt to render it perfect." The Commissioners, nevertheless, in defiance of this opinion, and of the report of their own surveyor, and after their official condemnation of the sewer, actually expended upon it nearly 200,000*l.* The entire length of the sewer being 16,522 feet, they spent upon a small portion of it, viz., upon 5,233 feet, the sum of 70,104*l.* 17*s.* 6*d.*;

* See Report of Health of Towns Association, on Lord Lincoln's Bill.

and of the portion upon which this amount of money was expended, it is stated that—

"At the present moment it is an uncovered, open sewer (with the exception of 1009 feet recently covered in by Mr. Cubitt at his own expense), with an outlet so bad, that the water is penned back, during a considerable period (six hours) of each tide; and a most disgraceful nuisance in a great metropolis."

On the remaining part of this condemned line the Commissioners spent the further sum of 100,000*l.* and upwards; and succeeded in leaving the evils of this sewer in their full force, and as much unremedied as ever.

It further appears that—

"These Commissioners have recently executed on the Ranelagh line, near the Bayswater-road, what they call a diversion of the sewer, 1,167 feet, 9 inches, in length, at an expense of 3,471*l.* 10*s.* 0¾*d.*, a work which in a short time after its completion is discovered to be in so ruinous a state as to require an almost entire reconstruction. Still more recently another failure of a sewer in the same district has been announced, built by the same contractor, and under the same clerk of the works; this new sewer requiring to be reconstructed for the length of 240 feet, at an estimated expense of 360*l.**

It is shown that the difference of expense between the construction of faulty-shaped sewers, and those on a correct principle, is 1,800*l.* a mile; now, as 118 miles of such faulty construction have been executed within ten years, it follows that nearly a quarter of a million has been ignorantly and injuriously squandered away: a sum of money sufficient to defray the expenses of those sanitary improvements which are so urgently required.

I would now turn your attention from this mere pecuniary loss, heavy though it be, resulting from the faulty constitution of our Boards of Commissioners of Sewers, to the more formidable and melancholy loss in life and health which results from the inefficient manner in which London is drained and sewered.

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* See Report of Health of Towns Association, on Lord Lincoln's Bill.

It is stated, that in some undrained localities there was not a single house in which fever had not prevailed, and in some cases not a single room in a single house in which there had not been fever. "The districts in which fever prevails are as familiar to the physicians of the Fever Hospital," says Dr. Southwood Smith, "as their own names. In every district in which fever returns frequently, and prevails extensively, there is uniformly bad sewerage, a bad supply of water, a bad supply of scavengers, and a consequent accumulation of filth; and I have observed this to be so uniformly and generally the case, that I have been accustomed to express the fact in this way; if you trace down the fever districts on a map, and then compare that map with the map of the Commissioners of Sewers, you will find that wherever the Commissioners of Sewers have not been, there fever is prevalent, and, on the contrary, wherever they have been, there fever is comparatively absent." The facts that the annual deaths from typhus fever amount to 16,000, and the attacks of this loathsome disease to between 150,000 and 200,000, may give you some idea of the evils which result from a neglect of sewerage and drainage.

The deaths from typhus fever alone in England, were respectively in the years

1838 ..... 18,775.
1839 ..... 15,666.
1840 ..... 17,177.
1841 ..... 14,846.
1842 ..... 16,201.

Now, it is established by statistical returns that the age at which we are most liable to be attacked by fever, is from twenty to forty; that is, at mature age: the very epoch which is the *most important* of our lives, *because* it is the time when we are best adapted to fulfil all the duties of life, and to receive all its enjoyments. It is at this very period of our lives, however, that we are most exposed to the ravages of this pestilence. Now as the poor marry, and have children, in early life, and as this disease chiefly attacks them at middle

age, it follows that the heads of families are more subject to the devastations of fever than any other class of persons, and that they are peculiarly liable to be attacked at the very period when their health is of the greatest importance, to enable them to maintain a number of young and helpless children. This fact may partly serve to explain the statement, that at Lady-day, 1840, the number of widows chargeable to the poor's-rates was 43,000, and of orphan children, 112,000. With regard to the local expenses incurred in consequence of this preventible disease, it is a fact, that the Bethnal Green and Whitechapel Unions incurred an extra expense for fever cases for the quarter ending Lady-day, 1838, the one of 216*l.* 19*s.*, the other of 400*l.*, making a total of 616*l.* 19*s.*; and being at the rate of 2,467*l.* 16*s.* a year. And of the total number who received parochial relief in most of the districts, a very large proportion received it in consequence of their being ill with fever; but in one district, namely, St. George's, Southwark, out of 1467 persons who received parochial relief, 1276—that is, the whole number with the exception of 191—are reported to have been ill with fever.

It is impossible, surely, that we can calmly survey the slaughter of some 16,000 or 18,000 of our fellow-countrymen annually, by a disease so purely preventible, so clearly traceable to filth and supineness, as fever. And while we consider the numerous victims on whom it lays its fatal grasp, let us look to the misery and wretchedness which must result from some 200,000 cases of severe and protracted sickness; let us then reflect that all this death, and all this sickness, with their attendant misery, wretchedness, poverty, pauperism, immorality, and crime, are in our power wholly and entirely to prevent. Does not the omission of our duty to do all that each of us can, whether singly or combined, to mitigate such a deplorable evil, constitute a crime?

The influence of drainage on the longevity of the inhabitants of towns may be further illustrated by the fact, that in the parish of St. Margaret, in Leicester, with a population of 22,000 persons, almost all of whom are artizans, and where the average age at death in the whole parish was, during the

year 1846, only eighteen years, on taking the ages at death in the different *streets* in this parish, it was found that in those streets that were drained, (and there was not a single street in the place properly drained) the average age at death was 23½ years; that in the streets that were partially drained, it was 17½ years; while in the streets that were entirely undrained, it was only 13½ years.

The effect of proper street cleansing and proper sewerage may be illustrated by a few facts taken from the Report of the Health of Towns Commissioners. Thus—

Mr. Holland, of Manchester, states that in twenty streets in Chorlton-on-Medlock the mortality fell from 110 to 89 per annum, after, and no doubt principally in consequence of, the streets being properly paved and drained. Mr. Gardiner and Mr. Noble had confirmed the result, by showing that in certain streets in St. George's district, Manchester, the deaths in 1838-1839 amounted to 495; but that in 1841-1842, after the streets were paved and sewered, the deaths were only 432, being a diminution of 53, or about one-eighth. In a district in Ancoats a diminution of 40 deaths out of 270, or about one-seventh, followed a similar improvement. But a still more striking illustration of the same fact is contained in Mr. Liddle's evidence before the Health Commission:—"Windmill-court, in Rosemary-lane, was one of the most unhealthy in my district. It was unpaved and filthy, and with stagnant water before the houses. I used to visit it sometimes two or three times a day for fever cases. About twelve months ago it was flagged; it was well supplied with water from a large cast-iron tank, which enables the inhabitants to have a constant supply, instead of an intermittent one, on three days a week. The court is regularly washed down twice a week, and the drains are so laid that all the water passes through the privy and carries off the soil, which was formerly a most foul nuisance, and a constant expense to the landlord. In the seven months ending March, 1843, I attended forty-one new cases of sickness in that court; in the last four or five months I have had but two cases. The rent is better paid, and the landlord is considered to have made a good thing of the improvements, which are executed at his own expense. There is no doubt that sickness is the most common cause of the inability to pay the rent."

Besides the beneficial results and economical arrangement which improved sewerage, drainage, and street cleansing would produce, there is also to be taken into calculation the economical distribution of the sewer water, which might be

preserved for agricultural purposes, in place of being suffered to drain away into the ditches, thence into the rivers, and ultimately into the sea, from perhaps a half of all the farm-yards of England. In Flanders, where manure is carefully collected, instead of being, as here, suffered to run to waste, the *excreta* of an adult are valued at £1 17*s*. If we add the enormous additions made to this manure in towns, £2 per head of the population cannot be considered too high an estimate of the value of that part of the refuse which now runs to waste. If the towns in England and in Wales which are guilty of this extravagance contain in all only 5,000,000 inhabitants, we shall have an annual waste of at least ten millions of money.*

The annual value of the chief constituents of the sewage water, which at present passes into the Thames from the King's Scholars' Pond Sewer, is £23,360; and of that which flows from all the sewers of London, on the supposition that the fluid they discharge is of equal strength, £433,879.†

On the subject of cesspools I would observe, that they are pestilential nuisances; that we have abundance of proofs of disease and death being produced by them, and that with an efficient system of sewerage, and a due supply of water, at a cheap rate, they could effectively be abolished, and a proper water apparatus substituted in their stead, at a very trifling cost. For five or six shillings a year, or for a weekly charge of 1½*d*. per house, it is stated that water companies could construct, and keep in repair, such an apparatus; this substitution would be the means of remedying one of the greatest abominations which can possibly be suffered to exist in the midst of a large city.

It is proved, that under appropriate management and arrangements, water may be carried into houses, proper house drains, and means of cleansing introduced, and branch sewers

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* See Appendix D.

† Evidence of Professor Miller, Report of the Select Committee on Metropolitan Sewage Manure, p. 41.

formed, at nearly one-half the annual or weekly expense now incurred for the proper cleansing of cesspools alone.

Ninety-two per cent. of the replies returned to the queries of the Health of London Association, state that the cesspools and privies in the poorer neighbourhoods are full, and suffered to overflow. Not many months since, the landlady of some small houses in Armstrong's buildings fell into an open privy, and was suffocated. I have already stated that in Derbyshire street, after rains, the contents are washed into the houses. This occurs in numerous other instances. I am informed that the only substitutes for privies in the poorer dwellings of some localities are holes dug by the inmates of the rooms, about two feet deep; these are soon filled up, and are then allowed to empty themselves by the rain washing the soil out upon the surface of the yards, there to evaporate. 95 per cent. of the same replies inform us that the poor in their vicinities are compelled to make use of common privies indiscriminately. Many houses have no privies at all; a few have separate holes, from two to three feet deep, with no drain from them. Generally each cluster of houses constituting a court has a common privy, *but not always*. Where the houses consist of several rooms, with, of course, three or four families residing in them, there is usually, but by no means always, one privy in common for them all. In low neighbourhoods, I have seen one privy serve for eight, ten, or twelve, or even more houses, each containing separate families. The condition of these privies is generally of the most revolting character.

It is utterly impossible that any population can be healthy which lives amid cesspools, or upon a soil permeated by decomposing animal and vegetable refuse, ready to give off at all times the most noxious exhalations. Oftentimes we find the walls of houses infiltrated, and constantly wet with fœtid fluid, which destroys the health and lives of those living within its death-dealing influence. Food in such places becomes tainted, and it is impossible to preserve it, even for a single night.

The springs and wells near cess-pools become affected and polluted, and are at last compelled to be abandoned; none

ever make use of them but those who do not know their reputation, and their foul produce. One of the noblest public charities in London has, within the last year or two, sunk large cesspools within a few feet of the well which supplies the whole establishment with water, as well for drinking, and cooking, as for domestic purposes.

It is related that a very foul drain or cesspool, attached to a school near Clapham, was opened in the month of August, and its contents thrown into a garden near the school. One of the boys was attacked two days afterwards with cholera, and in one or two days more, twenty others. Two cases terminated fatally.

A few years ago a public institution, containing from forty to sixty inmates, was the scene of much distress, in consequence of their being attacked by a low form of fever. This occurred in spring, and at first did not excite much attention, until a great number became successively attacked with the disease. The drains were accused of being out of order, underwent repairs, and were trapped; by the time this had been accomplished autumn had come, and the fever gradually disappeared, with one or two solitary cases; but early next spring the disease again set in, and in a more virulent form; the dormitories became fever wards, and the house a fever hospital. A more complete examination of the premises took place, when it was discovered, that in order to save the expense of removing the nightsoil, it had been the custom to remove it from the open necessaries and cesspools, and fling it into holes dug in the loose earth at the end of the yard. The earth was sprinkled over the soil, and formed, in dry weather, a sufficient defence against an ocular detection of the decomposing filth contained below; but in rainy weather the soil was washed up, and partly dissolved by the water, which covered the whole of the end of the open yard—there it stagnated, and in its pasty and semi-fluid state sent forth the pestilential gases which occasioned the severe and extensive amount of disease which prevailed within-doors. The whole of the nightsoil was removed, the fever abated in severity and frequency, but the inhabitants never in that

house had good health. Since the removal of the establishment to a healthier spot no case of disease has occurred, which could not be traced to accidental causes, or agencies in existence previous to the party coming to reside in the establishment, and the duties of the Honorary Medical Officer, in place of being most onerous and oppressive, have become comparatively nominal.*

The decomposing animal refuse in these places gives rise to three distinct gaseous products, each of which exerts injurious and fatal influences. They are sulphuretted hydrogen, hydrosulphuret of ammonia, and nitrogen. The first two are exceedingly deleterious. They may exist either in combination, or separately, in the soil of privies and cesspools. In Paris, and other large cities, where the soil is often allowed to collect, in large quantities, before any attempt is made to remove it, its removal becomes a highly dangerous occupation for the workmen, for when an attempt is made to disturb it, a large quantity of vapour, charged with death, may suddenly escape and destroy all present.

Modern researches strongly tend to prove that all fevers, and the malignancy of all eruptive fevers, derive their origin, if not from this cause, namely, the gases which are given off from the decomposition of animal refuse, at least from a cause which produces precisely the same phenomena in *the living body, and leaves the same appearances in the dead.*

Cesspools abound to such an extent in London, even in the mansions in the very best squares and streets, that, in numerous instances, their very existence has been lost in oblivion, and they only come to light through the deleterious and fatal effects which they are continually producing upon the ignorant victims in their vicinity. It is necessary, however, that we should recollect that *physical ailments* are not the *sole* consequences of the filth which abounds round the dwellings of the poor. An infinite extent of demoralization is produced. None of the decencies common even to the

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* Dr. Gavin. See Report of Health of London Association on the Sanitary State of the Metropolis.

lowest stage of civilization can be maintained; and the dwellers in such scenes naturally become regardless of the feelings and happiness of others, and intensely sensual and selfish. By the constant indulgence of their passions and appetites, idleness, dishonesty, debauchery, and violence are produced; and a kind of training, the result of which is brutality and ruffianism. It is from these wretched dens, in these neglected districts, that there live from birth a population out of which come pickpockets and thieves, degradation and profligacy, and our most atrocious criminals.

Besides these fertile sources of disease now referred to, London tolerates in its bosom a vast variety of nuisances, alike destructive to the health and comfort of its inhabitants; such as accumulations of filth in nightmen's yards, collections of dung for sale, swine-pens, slaughter-houses, knackers' yards, cow-sheds, pig-styes, gut spinning, tallow boiling, the burning of animal and vegetable matters, such as animal charcoal by the sugar refiners, the desiccation of nightsoil, and a thousand others.

London likewise permits to exist within its circumference a vast variety of offensive trades, manufactories, chemical works, and gas manufactories, which pollute and defile the air, and prove most destructive to the health and comfort not only of the workmen engaged in them, but of those who are exposed to their extended influence.

None of these are effectually controlled by, or properly subjected to, the operation of the law.

Pig-styes, dust-bins, and collections of ordure abound everywhere throughout this metropolis. The filth which is derived from these sources is abundantly made use of, in the suburbs of London, to manure the little plots of ground attached to the damp, ill-drained, and ill-ventilated dwellings of the poor. The manure is seldom dug into the ground, but strown on the surface, presenting, as it were, a practical design, carried into deliberate execution, to poison, by fever, the whole neighbourhood. Collections of garbage and filth abound in many places, and are often allowed to remain for

a great length of time before they are removed, on account of the inefficient manner in which the streets are cleansed.

The next most important object to be accomplished, to improve the health of London, is to obtain a sufficient supply of pure water, at a cheap rate, for domestic purposes, as well as for public demands, and for the cleansing of the streets and the flushing of the drains.

The supply of the Metropolis with water is at present divided amongst nine large, and two lesser, Water Companies, who are practically irresponsible for the quality, and quantity, of the water which they supply. In 1830 it was stated to Parliament that the capital then invested for the supply of the Metropolis was 3,310,342*l.* Since that period extensive additions have been made to this capital by the several Companies, and *still the greater part of the dwellings of the poorer classes are either altogether without water, or are furnished only with a very scanty supply of unfiltered water of a high degree of hardness. According to the last returns, there were upwards of* 70,000 *houses, out of* 270,000, *without any supply of water whatever.*

The water is supplied by pipes, but the supply is intermittent, three times a week, for a few hours—generally two hours—only, and with a force so insufficient, that it frequently happens that the last houses of a row, or street, have no supply at all. The *price* which is paid is *extravagantly high*, the *supply* is utterly *insufficient*, *intermittent*, and at a *low pressure*, in place of being *constant*, and at a *high pressure.*

The facts collected by the Commissioners of the Health of Towns, with regard to the quality of the water, go to prove that it is for the most part *bad.* For a sample we may take the district supplied by the River Thames, into which all the sewerage of the Metropolis is discharged.

The hardness of the water supplied to the inhabitants of London unfits it for most domestic purposes—for making tea and coffee—and for cooking, it occasions great waste of heat, and destroys the utensils themselves; it occasions increased labour in washing, and wear and tear of the articles washed;

it also increases unnecessarily the quantity of soap which requires to be used. The cost of the annual average consumption of soap, in the Metropolis, is £600,000, and it is reckoned that one-half of the amount, thus expended, might be saved by the use of a softer water.

All the water supplied to the inhabitants of London should be filtered. The ease and the very small expense with which water may be filtered on a large scale is proved by the fact, that the cost of filtration varies from the half to the one-sixth of a penny, for 1,000 gallons.

"The cost to the Southwark Company, for example, is the one-sixth of a penny for 1,000 gallons, which for the supply of a labourer's tenement, assuming it to be 40 gallons per diem, amounts to 4½*d.* per annum, or one-third of a farthing per week. So that at the rate of 5 per cent. interest on the fixed capital employed, making altogether 8*d.* or 9*d.* interest, and 4½*d.* management, the total cost is little more than 1*s.* per annum, or less than one farthing weekly, for ensuring the purity by filtration of a supply of 40 gallons of water per diem for beverage, for culinary purposes, for washing, for baths, and for all other purposes."—*(See Report of Health of Towns Association.)*

In consequence of the intermittent supply of water, there arises a necessity for butts, or tanks. "The butts," says Mr. Toynbee, "are made of wood from which the paint has often decayed; sometimes the wood itself is decayed; they have commonly no cover on the top, and a film of blacks and dust forms on the surface of the water. The water is generally laid on in the yard or lowest part of the premises, and a supply is generally given three times a-week, and at each time the water comes on, the film of dust and blacks that has been deposited on the surface is mixed up with the previous accumulations." Even in a more open and less sooty and dirty neighbourhood, as in the Green Park, the deposit of soot, or dirt, or dust, at times, may be observed as a dark scum, or carpet spread over the surface of the Water Company's reservoir.

It is stated, and I have myself, in thousands of instances, in the course of my practice, observed the same, that the water retained in the rooms of the poor for domestic use

"soon becomes covered with black scum," and that there is generally "a filthy accumulation on the surface of the water butts." How can it be otherwise, it is asked, when the water is kept in rooms "small, dark, and dirty," which the inhabitants themselves describe as "stinking alive," over-crowded with the living and still occupied by the dead; or when the water-butts are placed in "little back yards, without cesspools or privies, where all the excrements are allowed to accumulate for months together, or without drains to the cesspools where the latter do exist, so that the excrements run into courts or streets, where they remain until a shower of rain washes them into the gutter?"

The tubs and earthen vessels in which the poor preserve their water, are generally uncovered, and the water exposed to the impurities of all kinds which float in the air, and covered with soot and dust; frequently a green scum is found upon it, arising from the decomposition of the wood. It is stated that cisterns ought to be cleansed *once* a fortnight, and butts *once* a week, and that "if people take *ordinary* care with these cleansings, they will have clear water; but that it depends upon the inhabitants themselves."* Every day's experience, even in our own households, shows that not *one* person out of a *thousand* will take this burdensome "*ordinary care*," (the necessity of which occurs as constantly as the day,) and that if the purity of the water is to depend upon "the ordinary care" of the inhabitants themselves, they will *not* have clear water.

The supply of water in this inconstant mode, puts the consumer to the greatest inconvenience to obtain it, and that inconvenience falls most heavily on the poorer classes, who are obliged to retain the water in such vessels as they happen to possess. The poor must watch their opportunity of collecting water during the period that it is turned on, and those who are engaged in out-door occupations necessarily lose their chance of getting a supply.

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* Mr. Wickstead, Engineer of the East London Waterworks Company and of the Kent and Vauxhall Waterworks Companies.

"It frequently happens," says Mr. Quick, "that the man and woman are out at work during the time the supply is on the common tap. When they return home there is no supply; and this may occur from day to day. If the man has work he is generally out, and a large portion of the women work from home."

The trouble and labour which this mode of supply imposes on the poor, operate as a heavy and unnecessary burden, by exhausting their strength. It is notorious, to those acquainted with the habits and customs of the labouring population, that they regard as an intolerable burden, on their return home, tired with the day's labour, to have to fetch water from a distance, out-of-doors, in all seasons, and in all weathers.

"So far are the labouring classes from being able to fetch water after their return home from their work, that one considerable obstruction to their cleanliness is found to be their inability to carry dirty water down stairs."—(*Report of Health of Towns Association.*)

"One source of the dampness and smell," so frequently found in the rooms of the poor, "is the vessels of dirty water retained in their rooms." The common excuse for this retention is, "We are so knocked up with the day's work, that the water must wait until to-morrow, when we shall be able to remove it." The labour of carrying water *up* stairs is felt as a grievous evil.—(*Mr. Toynbee, Report of Health of Towns Commission.*)

The inadequacy of the present mode of supply causes the poor to put aside their water for repeated use, and to use but a very small quantity in cooking; it also causes them to boil their vegetables without their being washed, to save them the trouble of fetching more. It, very generally, causes them to neglect every sort of cleanliness, whether of their houses, their persons, or their clothes.

Another evil consequent on this mode of supply is, that the poor are drawn to the taps common to many houses, where, from the impossibility of all being served at once, and from the fear that the water might be turned off before their turn should come, quarrels are generated—exceedingly injurious to the moral and peaceable disposition of the poorer classes. Mr. Rushton, a police Magistrate, states that a large propor-

tion of the cases of assault brought before him, are traceable to the disputes engendered by this mode of supply.

"Among the evils of an intermittent supply to the people themselves," says Mr. Quick, "are the loss of time in waiting for what they call their turns, and the demoralization from the numbers brought and kept together. I have seen as many as from twenty to fifty persons with pails waiting round one or two stand-pipes."—*First Report of Health of Towns Commission.*

The next objection to this mode of supply is, that, while it is inconvenient, inadequate, and demoralizing, it is at the same time highly expensive.

In the Report of the Health of Towns Association it is stated, that "the present daily consumption of water in the metropolis is equal to the contents of a lake fifty acres in extent of a mean depth of three feet." On account of the intermittent mode of supply having been universally adopted, receptacles to receive this mass of water at the times when it is pumped out, and to retain it, are required until it is wanted. The actual cost of these receptacles in the shape of butts, tanks, and cisterns, is estimated at two millions of money; and those who have attentively considered the subject believe that this estimate is too low.

The advantages of a *constant supply of water at a high pressure* are so great, and the necessity of it so urgent for the comfort and well-being of the whole people, as forming an essential feature in all sanitary improvements, that I shall be excused for summing them up. By a constant supply the water would be preserved in a state of purity, and the numerous evils which arise from the want of proper receptacles, and from the prevailing neglect in cleansing the tanks, and water-butts, and from the accumulation of soot, dust, and other impurities in them, would be completely removed. The effect of such an arrangement would be to substitute one large reservoir or tank, properly constructed, placed, and superintended, for the many thousand ill-constructed, ill-placed butts and tanks, which are required to afford a sufficient supply on the common arrangement. It would prevent the impregnation of

the water with gas, which frequently takes place under the present system. Moreover, an uninterrupted stream of water would not acquire an unpleasantly high temperature, as collected water does; it would likewise be secured from the absorption of vitiated air, and unpleasant effluvia, which hasten the decomposition of the small amount of organic matter which generally exists in water. It is but lately that two large oil butts, said to be well burned, were placed to receive the rain-water of a building. No rain having fallen for some time, they were pumped full from a deep well, near which were several cess-pools; four days afterwards I was struck with a horrid stench arising from some water used to water plants; on investigation, I found it had been drawn from the butts, the water in which was quite putrid, and most offensive. In that building much gastric derangement prevailed, and several cases of erysipelas, one of which proved fatal.

By a constant supply, the space occupied by the receptacles for water would be saved, which to the poor, who have but slender means of accommodation, would be most important;—even to those who are in the upper classes, the constant supply at high pressure would be most useful, as it would save all the trouble, and expense, of carrying water up and down stairs, and the cost of force-pumps if cisterns should be placed on the second or third floors. "The East London Water-works, for example, give their supply at such a low pressure, that it will not reach a cistern on the first floor of a fourth-rate house,—and, in some instances, will not even reach the last house of a court supplied with a common pipe."*

By a constant supply, the time and labour consumed by the poor in fetching and carrying water would be saved, the causes of quarrels at common pumps would be avoided, the cost of the receptacles for holding water—calculated at £2,000,000 in London, and the constantly recurring expense of keeping them in repair, would be saved.

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* See Report of the Health of London Association.

Another advantage of the proposed mode of supply would be its universal practicability.

"As the result of a careful calculation," it is stated, "that, supposing the daily supply of the metropolis to be equal to a lake of fifty acres, of a mean depth of three feet,* a first investment of 15*s.* per head, or 9*d.* in addition to the annual water charge of each of the population, would enable a constant supply of the purest soft water to be delivered at all hours, into every story throughout London, and that without injury to the interests of the existing companies, who might derive their supplies from a common source. A very considerable economy of management and working expenses would indeed result from the consolidation of engineering operations, which would go far to reduce the increased charge of 9*d.* per annum."† "It is also shown, that a constant supply of pure and filtered water might be brought from Windsor to the metropolis at a charge not exceeding 2*d.* per week per house, one with another, or at a 1*d.* per week for the lowest class of tenements."‡

"Mr. Joseph Quick, engineer of the Southwark Water Company, states that he entirely concurs with the statements made by Mr. Hawksley," which I have just read to you, and "that he has calculated the additional expense that would be incurred per week per tenement for such an increased supply within the district supplied by the Southwark Water Company; that this expense would be three half-pence per week; and that a large proportion of this extra expense would ultimately be saved by dispensing with the necessity of the water-butts and tanks, and all the expense connected with their wear and tear, and their repairing, renewing, and cleansing."§

It has been stated, that the poor could not afford to pay for a constant supply of water, but all who are acquainted with the wants and wishes of the poor know that they would most willingly pay their share of the expense, which a constant supply might create; suffering, as they do, from a great deficiency of, and an extreme difficulty in obtaining, water. An abundance of evidence has been accumulated on this point. In fact, *there is no boon which would be more highly prized by the poor* than an unlimited supply of water, and for which they would more willingly pay a fair and adequate price.

The last advantage, of a constant supply of water at high pressure, to which I shall direct your attention, is the security

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* Mr. Hawksley. First Report of Health of Towns Commission.
† Ibid. ‡ Ibid. § Ibid.

which it affords, as an efficient means, of rapidly extinguishing fire.

"It is stated, that wherever there is a *constant supply of water at high pressure*, it is easy, in the space of two minutes after the first alarm of fire, to bring water at the rate of thirty gallons a minute to bear upon any house in which a fire occurs. On the other hand, it is found that in country towns, at least, the average space of time before a fire-engine can be brought to the spot and set to work is half an hour. It is estimated that when the fire broke out in the Exchange at Nottingham, which is supplied with water at high pressure, water at the rate of 120 gallons per minute was poured upon the flames and all around the building; and it is considered probable that but for this quick and ample supply the fire in question would have been as extensive as the recent fire at Hamburgh."*

"Under the system of constant supply at high pressure, even the smallest street might be supplied with a three-inch main, affording at least one 40-feet jet, which is equivalent to keeping the power of one engine and twenty men at every door, to act at one minute's notice after the first alarm of fire."†

I may refer to one case, "in which water is carried into every room of a factory; the cost of fitting up the apparatus was £150, and £4 per annum is paid for the supply of water. The owner of this factory was accustomed to pay for the insurance of his mill £200 per annum, which insurance he now discontinues, so that, for an annual charge of £14, he obtains the same or greater security against loss by fire as he did by the annual payment of £200."‡ "But the expense of fitting up a warehouse with plugs in each story is only from £25 to £30§—a guinea, in addition, being paid annually for the water. In Manchester the saving of insurance on 66,000 houses is £20,000 per annum; *in the metropolis it would be much above* £100,000. According to the police returns, the estimated value of property destroyed by fire in Manchester during the last five years is £324,305 8*s.* 3*d.* It may fairly be assumed, from the facts stated, that one-third of that destruction would be prevented by a constant supply of water at high pressure. It is probable that the saving of property by the diminution of the loss by fire would be equal to half the entire cost of the water supply."‖

Water, like Railway Companies, are trading bodies; in proposing to execute public works, they only looked for a

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* See Report of Health of Towns Association.

† Mr. Quick. First Report of Health of Towns Commission.

‡ Second Report of Health of Towns Commission. § Ibid.

‖ See also Report of Health of Towns Association.

profitable investment for their capital. But in order to execute these public works, they required, and obtained from the Legislature extensive powers, privileges, and immunities; it, therefore, became *a duty* of the Legislature, while granting these privileges, to take securities for the efficient performance of these public works. But this duty was not discharged, and the powers with which the companies became invested, converted them into monopolies, under which the grievances, which I have detailed to you, have sprung up. These monopolies are now returning enormous profits to the fortunate shareholders, and, unless they are effectually controlled by a beneficent Government, will continue to drag their slow length along, indifferent to the enormous amount of human misery which they occasion. It has been well observed of them in the Report of the Committee of the Health of Towns Association, on Lord Lincoln's Bill, "that on no principle of justice can the community be taxed in perpetuity to defray the expense of former ignorance, waste, extravagance, and jobbing; and under no circumstances ought the public health and property to be sacrificed to the representations of parties interested in the maintenance of a system proved on the fairest and fullest investigation to be vicious." It is absolutely necessary for the public health, (the supply of water forming, as it does, an essential and component part of every means of sanitary improvements,) that all existing Water Companies should be compelled to adopt the mode of constant supply, at as high a pressure as practicable, by alterations of their works, approved of by an Inspector.

After an experience of a certain period of time, if they could show that they had sustained any loss by the change, they should be entitled to have such loss made good to them out of a rate; in general there would be *no loss;* but if there should be, it is only fair that it should not be thrown on the Company, but on the community for whose benefit the change has been demanded. The manner in which the ancient Romans went about the construction of a city, and their early perception of the advantages and necessity of good and sufficient sewerage, and an abundant supply of water, have been

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painfully contrasted with the present miserably defective sewerage and supply of water to London. If the present supply of water to London be compared with the probable supply to Rome, when she boasted of her 1,000,000 of inhabitants, we shall be struck with shame by the comparison. The magnificent and gigantic aqueducts, which conducted 50,000,000 cubic feet of water into the Eternal City, remain, though in ruins, to testify the value which the ancient Romans placed on cleanliness; but this mighty city, of more than 2,000,000, has for each of its inhabitants only one-twentieth of the supply furnished to each Roman. The difference is the more disgraceful, and discreditable to us, as a people, inasmuch as the laws of hydrostatics, and the supply of water by Artesian wells, were unknown to the Romans, and modern science has placed at our command resources of infinite power.

I believe I have demonstrated that accumulations of decaying animal and vegetable matters, and filth; the want of street-cleansing, paving and drainage, defective sewerage, and an insufficient supply of water, are the causes of a high rate of mortality. It is proved, most abundantly, that they are the causes of fever and of febrile diseases, of the malignancy of scarlatina, measles, hooping-cough, small-pox, and of a vast variety of other ailments. Now, while we have not much power to mitigate these evils after they have been created by our negligence and indifference, we may so guard ourselves by sanitary precautions as to bid defiance to their approach, and render ourselves impregnable to their attacks.

This is to be done by abolishing the causes of fever; by extending sewers into every street, court, and alley; by making communications from every house to such drains; by paving and cleansing the streets; by removing all nuisances; and by frequent flushing of the sewers.

It may be asked, how are the enormous sums, that would be required to carry out such gigantic undertakings, to be raised?

The plan proposed is, that whatever capital is required should be raised by loan, or by private individuals, or by a

public company, contracting for the execution of the works on the security of a special rate, to be levied on the property in the several localities, the principal and interest to be repaid within a limited number of years. The burden would thus be commuted into a rent charge, which every tenant would cheerfully pay, on account of the increased comfort and accommodation which he would receive.*

Dr. Lyon Playfair well remarks, that "upwards of £5,000,000 are paid annually, in England, to *sustain* the attacks of preventible disease among the population of this country, and not one pound to remove or weaken the sources from which these attacks gain strength."

The next important subject, especially affecting the health of towns, to which I shall allude, is Ventilation; a subject whose importance is even less understood and acknowledged than the operation of the other deleterious agents which I have referred to; because, while these last destroy, they also warn by their offensive odours, but defective ventilation may exist without imparting much appreciable offensiveness to the air which we breathe.

The great object of drains, sewers, the suppression of cess-pools, the removal of nuisances, and the supply of water to cleanse the streets, drains, and sewers, is, in fact, to prevent the contamination of the air, and to preserve it in a state fit for respiration and for sustaining life.

Now, in order to illustrate the *necessity* of ventilation, and to impart a just conception of its vast importance, it is requisite to inform you as to some particulars connected with your very existence. The continuance of life in man requires that his blood should be freely exposed to the air; in fact, ventilated. The chest and the lungs are the mechanism by which this ventilation is effected. They occupy a large portion of the human structure. This mechanism requires to be in perpetual exercise, night and day, waking or sleeping: if it stop but two or three minutes, we perish.

* See Report of Health of Towns Commission.

Among the Navarino sponge divers, there was not one who could remain submerged for *two* consecutive minutes. The best pearl divers of Ceylon can rarely sustain a submersion of more than fifty seconds. Now, the action of breathing is duplex: by the first action, pure air is taken into the lungs; by the second, the air so taken, having been changed in its composition, and partially deprived of its life-sustaining power, is thrown out of the lungs.

Now, there are eighteen respirations in a minute; consequently, 1,080 in one hour, and 25,920 in twenty-four hours. By each inspiration one pint of air enters the lungs; consequently, eighteen pints in a minute; in an hour, more than two hogsheads; and in twenty-four hours, upwards of fifty-seven hogsheads of air enter the lungs.

Dr. Southwood Smith, in his "Philosophy of Health," has reduced these calculations to a form that must strike the most careless observer.

The heart beats about seventy-two times in a minute; with every beat two ounces of blood are sent to the lungs; consequently, 146 ounces in one minute, being rather less than eighteen cubic inches, exactly an imperial gallon; in one hour, 450 pints, or about 562 pounds, or rather more than a hogshead; and in twenty-four hours, nearly 11,000 pints, about 13,488 pounds, or upwards of twenty-four hogsheads.

The blood performs one complete circuit in the system in 160 seconds; consequently, 540 circuits in twenty-four hours, or three complete circulations throughout the body in every eight minutes.

We may say, then, that there flow to the lungs every minute, eighteen pints of air, and eight pints of blood; and in the space of twenty-four hours, fifty-seven hogsheads of air, and twenty-four hogsheads of blood.

From the nature of our organization, we absolutely require, as an essential to the continuance of our existence here on earth, a constant and large supply of *pure* air. It follows, if we do not have this abundant supply of air, in a pure form, that the consequences which are affixed to a violation of the laws of nature will surely result. What are those conse-

quences?—Disease and death. Surely, it can require but little reflection, *à priori*, to determine what will be the effects upon the health of animals, who, for the preservation of their health, daily require fifty-seven hogsheads of pure *air*, and who yet never breathe a pint of it.

You will probably remember, from what was said of the gases evolved from the putrid ponds in Lamb's Fields, and behind St. Peter's Church, that decomposing animal and vegetable matters evolve poisonous gases, and invisible organic particles, which intimately mix with the air, alter its composition, corrupt it, and render it, in place of life-sustaining and health-reviving, noxious and deadly. The air containing such poisonous exhalations has been collected, and the vapour condensed by cold, and other agents; by which means a residuum has been obtained, which has been proved to consist of vegetable or animal matter in a high state of putrefaction. This residuum, thus obtained, is a deadly poison; a minute quantity applied to a healthy animal will destroy life with the symptoms of the most malignant fever; and by varying the strength of the poison thus applied, fever of almost any type, and possessed of almost any degree of destructive power, may be produced. Sometimes the poison, suspended in the air, is weak—that is, largely mixed with air—and produces merely a certain amount of physical and mental depression; this effect is exhibited in nearly the whole of the population of London; principally, however, in the inhabitants of those situations where the causes chiefly operate. When the poison is stronger, that is, when either less mixed with air, or when given off in a more concentrated form—the noxious air acts progressively and rapidly, or progressively and slowly, in vitiating and destroying the vital fluid,—the blood, and disorganizing the structures of the body. The violent commotions of the system which then take place, as the result of this noxious agency, constitute what we term *fevers*, choleras, dysenteries, and other mortal epidemics. But if the poison be concentrated, or only diluted to a small extent with pure air, as frequently occurs when the soil in cesspools is stirred, and in newly-made graves, it will produce death within the space of a few minutes.

I have not thought it necessary to take up your time by attempting to lay before you a few only of the innumerable facts which prove the connexion of filth and fever, as cause and sequence. The facts are incontestible. They have been, and are, daily proved by observation and experiment, by chemical researches, whether analytic or synthetic, by all history, whether past or present. They are as evident as the sun at noonday; and sixty or seventy thousand deaths, annually, in England and Wales, attest our knowledge, and confirm our belief.

Now, let us suppose that an enlightened government, and a people willing to help themselves, have, by the means already pointed out in the course of this evening—namely, effective drainage, sewerage, street and house cleansing, the suppression of cesspools, the removal of nuisances and noxious trades and manufactories, and by an abundant supply of water, —removed these causes of disease and death, there would still remain much to do in the way of ventilation.

I have sufficiently clearly pointed out, that for the preservation of our life, we must breathe. Now, the very act of breathing is the great cause of the deterioration of the air, and of its becoming unfit to sustain life. The air in the lungs, during respiration, is exposed to 170,000,000 of cells, having a surface equal to thirty times that of the body; it becomes deprived of a portion of its oxygen, or life-sustaining power, and becomes loaded with deadly carbonic acid gas, and is rendered nearly totally unfit for a second respiration, being, in reality, no longer pure air, but a poisonous gas. It is evident, therefore, that in our dwellings we require a frequent change of the air which we breathe, in order that the air which we have breathed should be removed, and that pure air should replace it. Besides the alteration in the constitution of the air produced by the act of breathing, another cause of the deterioration of the air in our houses is the combustion of lamps, gas-lights, candles, &c. A single candle is nearly as injurious to the air as a human being. Two fourteen-hole Argand gas burners consume as much of the vital, or life-sustaining air as eleven men. A

third source by which the air is rendered impure is the vapour, loaded with animal matter, given off from the lungs and the skin. Each of these parts pours out an ounce of fluid every hour; so that in a church containing 1,000 people, twenty-four gallons of noxious fluid are given off during the two hours which divine service occupies.

I am not aware of the exact number of individuals in London, who follow purely out-door employments; but there is no doubt, that a vast majority of the Londoners spend only an inconsiderable portion of their time in the open air. Two-thirds, at least, of the twenty-four hours are spent in-doors, in the sitting-room, the work-room, or the bed-room. It follows, therefore, that the health, and ultimately the life, of those who pass their lives in-doors must depend on the quantity and quality of the air *within* the house. Nevertheless, if we examine the general construction of houses, we shall find them adapted, as it were, closely to confine the air within four walls (as if it had been part of the furniture of the room, which it was most necessary carefully to preserve); and that no possibility of entrance is afforded to the external air, except by the crevices of the door and window; and no means of escape for the air, which is vitiated by breathing, by combustion, and by perspiration, except through the chimney. The chief aim, apparently, in the construction of houses of all kinds, has been to render them protections from the inclemency of the seasons, not habitations in which men are to "live, and move, and have their being."

In the construction of the houses of the poor, the main object of the builders is, to get the greatest possible return for the smallest possible outlay, utterly regardless of the comfort, health, lives, or morals of the people, who are too often driven into dens, to herd like beasts, without the protection given to, or the common comforts and necessaries provided for, the meanest domestic animals.

From what has been already said, it will be understood that a large number of persons will very rapidly destroy the power of the air to support life. It is computed that the population of a crowded town, by the mere natural action of

their lungs, in the course of the twenty-four hours, vitiate the air to an amount equal to a layer as large as the whole area inhabited, at least a yard in depth or thickness (to say nothing of the amount spoiled, and rendered unfit for breathing by fires and furnaces, lamps, candles, gas and gas-works, manufactories, offensive trades, nuisances, &c.). Now, in one small portion of London, the people are crowded at the rate of 243,000 inhabitants to the square mile. The very density of the population, therefore, becomes a permanent source of ill health. But in individual houses, what is the amount of air which the poor have to breathe?

This depends, *firstly*, on the size of the room which they inhabit, for the great mass of the poor have only a room, not a house, to live in;—*secondly*, on the number of its inhabitants. Now, the size of the rooms of the poor is exceedingly small; and not only are they small, but they are exceedingly low in the roof. The number that occupies each room is, of course, various; but in some districts it is rare that the room is confined to one family. In the Whitechapel Union, there are few instances where there is more than *one room* to a family. From calculations which have been made with regard to certain districts in Bethnal-green, it is proved that, in many instances, seven hours is the limit of the time during which life could be supported in these dwellings; that is to say, that the construction of the houses of the poor is such, that if the door and window be shut, during night, the sleeper is placed exactly in the same position as if he had been immured in the black-hole of Calcutta, for a length of time, equal to what sufficed to destroy the lives of so many of our countrymen, when thrust into it by the Nabob. Besides the dwellings of the poor, their workshops likewise are, nearly universally, entirely defective as regards ventilation, and, in many instances, utterly unfit for them to labour in. Nevertheless, they are compelled by the force of circumstances, and the nature of their occupations, to expose themselves to the operation of an agency, which slowly, but most effectively, undermines their health and morals, and ultimately destroys their life.

Dr. Guy furnishes us with a few facts, which I shall con-

dense, and make use of, to illustrate this part of my subject. In the first Report of the Health of Towns Commission, he refers to a building, in which 15 men were employed on the second floor, and 17 men in precisely the same way on the third, and uppermost floor. Now, as the vitiated air from respiration ascends, we ought to have a marked difference in the health of these two sets of men—and such in fact was the case—4 only of the 15 on the second floor made any complaint; but of the 17 employed on the uppermost floor, 3 had spitting of blood, 2 had affections of the lungs, and 5 constant and severe colds. 10 of these 17, *therefore*, were subject to diseases affecting the chest, while 1 only of the 15 in the room beneath had a disease of this nature.

Another workshop of the same kind, and constructed in the same manner, gave a similar result. 4 in 20 in the lower room, 10 in 20 in the upper room, had disease.

The following table exceedingly well illustrates the importance of a due supply of air. Of

Persons.	Cubic feet of air.	PER CENT.							
		Spitting of blood.	Catarrh.	Other Diseases.	Total.	Spitting of blood.	Catarrh.	Other Diseases.	Total.
104	who had less than 500 . .	13	13	18	44	12.50	12.5	17.31	42.31
115	who had from 500 to 600	5	4	23	32	4.35	3.48	20.00	27.82
101	who had more than 600 .	4	2	18	24	3.96	1.98	17.82	23.76

A man, entering one of the crowded workshops of a London tailor, at 20 years of age, has a worse chance of life at the age of 40, should he be so extremely fortunate as to overleap the improbability of his attaining that age, than he would have had at the age of 50, had he remained in the country. Not 10 per cent. of the workmen in the tailors' shops in London will be found to have passed the age of 50 years. It is shown in the tables of the Registrar-General, that 53 per cent. of these workmen die of diseases of the respiratory organs in the

metropolis, and only 39 per cent. in the country. In London, if we include the master tailors themselves, only 12 out of every 100 reach old age. In the country, about 25 out of every 100, or double the number, do so.

But, in order to illustrate the fatal effects of the want of pure air in sufficient quantity, and of the agency of the foul air produced by respiration, I may quote the following fact, related by Dr. Arnott, pp. 76, 77, in the Report of the Health of Towns Association:—

"In the Zoological Gardens in the Regent's Park," says Dr. Arnott, "a new house was built to receive the monkeys, and no expense was spared which, in the opinion of those intrusted with the management, could ensure to these natives of a warmer climate all attainable comfort and safety. Unhappily, however, it was believed that the objects would be best secured by making the new room nearly what an English gentleman's drawing-room is. For warming it, two ordinary drawing-room grates were put in, as close to the floor as possible, and with low chimney-openings, that the heated air in the room should not escape by the chimney, while the windows and other openings in the walls above were made as close as possible. Some additional warm air was admitted through openings in the floor from around hot water pipes placed beneath it. For ventilation in cold weather, openings were made in the skirting of the room close to the floor, with the erroneous idea that the carbonic acid produced in the respiration of the animals, because heavier than the other air in the room, would separate from this, and escape below. When all this was done, about sixty healthy monkeys, many of which had already borne several winters in England, were put into the room. A month afterwards more than fifty of these were dead, and the few remaining ones were dying. This room, open only below, was as truly an extinguisher to the living monkeys as an inverted coffee-cup, held over and around the flame of a candle, is an extinguisher to the candle. Not only the warmth from the fires, and the warm air that was allowed to enter by the openings in the floor, but the hot breath and all the impure exhalations from the bodies of the monkeys, ascended first to the upper part of the room, to be completely incorporated with the atmosphere there, and by no possibility could escape, except as a part of that impure atmosphere, gradually passing away by the chimney and the openings in the skirting. Therefore, from the time the monkeys went into the room until they died, they could not have had a single breath of fresh air. It was necessary only to open, in the winter, part of the ventilating apertures near the ceiling, which had been prepared for the summer, and the room became at once salubrious."

The diseases which are entailed upon our people by the constant respiration of the same air, are scrofula, with all its attendant train of local diseases, and consumption. From a careful analysis of the 60,000 deaths from consumption which annually take place in England and Wales, (the numbers actually were—

In 1838	59,025
„ 1839	59,559
„ 1840	59,923
„ 1841	59,592
„ 1842	59,291)

the conclusion has been arrived at, that the relative proportion of gentry, tradesmen, and labourers is, respectively, 16, 38, and 30; so that tradesmen are nearly twice as liable to consumption as the gentry, owing chiefly to the hot, close, ill-ventilated shops, in which the former pass so many hours of the day; that in-door labourers are more subject to consumption than those who follow their employments out of doors, though exposed to all the inclemencies of the weather, and earning less wages, and having, consequently, worse food, clothing, and lodging: and that of in-door labourers, those engaged in workshops are more subject to consumption than those employed at home, because the air of the poor man's room, small and mean as it is, is more wholesome than the greater portion of workshops, or even shops. Women, because they live more at home, are more frequently affected by consumption than men. In 1839, out of 33 milliners who died in London, 28 died of consumption.

The actual *waste* of life, in England, from pulmonary consumption alone, may be safely estimated at upwards of 5,000 persons; and this estimate appears, to me, to be very much below the truth. The chief cause of this great, and preventible mortality is the deficient ventilation of houses, shops, and places of work.

It is calculated that the half of this waste, that is, 2,500, takes place in London.

It is shown, that 120,000 persons are always slowly dying of consumption in England and Wales.

I do not think that you will require me to prove the statement which I am about to make, that impure air is the great and chief cause of diseases of the organs of respiration. It is a well-established fact, and admits not of contradiction. Now, of the 49,098 deaths which occurred in London in 1846, 14,368 were occasioned by diseases of the respiratory organs. Surely, this appalling fact is sufficiently striking, to demonstrate the absolute necessity which exists for some provision being made for improved ventilation, in the habitations of the poor more especially, and for its compulsory introduction into all places of public resort.

To live in rooms, and dwellings, and workshops, with every opening for the admission of pure air closely shut, is, in reality, as it were, voluntarily to destroy or obliterate a portion of our breathing apparatus—or, to reduce the function of respiration to the minimum, short of producing actual death; or, it may be compared to the application of an apparatus, or cord, round the windpipe, to compress the passage, and close it against the admission of air; and it is a curious fact, that the disease which is produced by this diminution of the amount of oxygen in the volume of the air inspired, actually obliterates and destroys the lungs, and that the victims often die asphyxiated; or, in common language, are suffocated.

This comparative strangling, or suffocating, as it were, of a great part of the population of London, and our large towns, it is partly within the power of the people themselves to remedy, and it is partly the duty of government to remedy what is beyond the control of individuals. In the future construction of the dwellings of the poor, compulsory regard must be had to an efficient and simple means of ventilation; but in every building appropriated to the use of the public, it is the bounden duty of government to see that the public safety is provided for. The means are sufficiently well known, and may be simply and economically applied. The neglect to use them becomes criminal. As a recent proof that ventilation must largely conduce to the prevention of disease, I may state, that during the past year there was a diminution of 800 in the number of sick applying for admission to the

St. George's and St. James's Dispensary, and it is believed that this remarkable diminution of the number of applicants was due in part, at least, to the improvement made by the Samaritan Fund attached to the Dispensary, in ventilating the abodes of the poor in the district.*

I have now discussed, cursorily, and imperfectly, it is true, the leading agencies which deteriorate the health, and destroy the lives of so many of the inhabitants of this wealthy, populous, and overgrown city. But I trust that this exposure of the evils which are endured in patient ignorance by a great mass of the population, will penetrate all whom I address with a strong sense of the absolute and immediate necessity which exists for sound and comprehensive sanitary regulations.

I would only now endeavour to impress upon you, that we have arrived at that period of the year, when, if we are to judge by the experience of the quarters ending in June and September last year, we shall have a large increase in our mortality over what we had in the corresponding quarters of 1844 and 1845. The extreme heat of the weather which we have lately had must produce its natural effect in accelerating the decomposition of all dead animal and vegetable matter. In the spring quarter, ending June 30, 1846, in 115 districts in England, there were registered 43,582 deaths, being 2,853 more than were registered in the corresponding quarter of 1845, and 4,731 more than in the corresponding quarter of 1844.

But, if the mortality in these 115 town districts had not been higher than in the poor—mark, I say *poor*—country districts, the mortality would only have amounted to 33,000. Within three months, then, in the spring quarter of 1846, 10,582 lives were lost in a part only of England, by causes which could have been removed; and from Dr. Lyon Playfair's estimate, there must have been 296,296 cases of sickness which did not prove fatal, but which need never have occurred.

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* See Appendix E.

In the summer quarter, ending September 30, 1846, there were 51,235 deaths registered; whereas in the corresponding quarter of 1845, there were registered 36,800, being an increase of mortality in the quarter of 1846, of 15,227. But if the mortality had only been 33,000, as it ought to have been by the judicious application of sanitary measures, there would have been saved, in certain districts of England alone, the lives of 18,235 persons, and the sickness and disease which was unnecessarily suffered by 510,780 persons.

The experience of the last quarter alarmingly proves the increased mortality which is prevalent. In the quarter ending March 31, 56,105 persons died in 117 districts; a number greater than has been registered in any corresponding quarter, and 6,035 above the corrected average.

Deaths registered in the March Quarters of Nine Years.								
1839.	1840.	1841.	1842.	1843.	1844.	1845.	1846.	1847.
42,410	46,376	46,967	44,903	43,748	46,136	49,949	43,850	56,105

15,289 deaths were registered in London, during the first thirteen weeks of this year. A greater number than has been registered in any previous winter since the Registrar General commenced the weekly table.

Deaths registered in the Eight first Quarters of the Eight Years.							
1840.	1841.	1842.	1843.	1844.	1845.	1846.	1847.
11,989	13,930	12,626	12,504	13,471	14,528	12,376	15,289

If we take the amount of fever which is now prevalent as a guide in forming a judgment of our sanitary state, the prospect is still more alarming.

In the return of the medical officer for the south division of the parish of Whitechapel, we find that, while he attended 33 cases of fever from the 30th Dec. 1846 to the 30th March 1847, he attended no less than 196 cases from the 30th March to the 30th June, 1847.

I have mentioned these fearful facts, to show you how essential it is that we should not lull ourselves into a false and fancied security, by believing that our sanitary condition is improving. The Registrar General, in his last report, states that it is evident that the health of towns in England is at present stationary, not to say retrograding. Knowing, as we do, that the mortality in towns is referrible to the inadequate supplies of water by Company Monopolists; to the insufficiency, or utter want, of sewerage; to the open drains, ditches, cesspools, and to the general want of street and house cleansing; to the innumerable pigstyes, cow-sheds, knackers' yards, slaughter-houses, and other offensive and noisome trades and occupations, which cause great quantities of organic matter to remain, every where, on the surface of the ground, there slowly and naturally to pass through every offensive stage of decomposition into its elementary forms: we must not be surprised that mortality, like the putrefaction which is its cause, should be increased when the temperature becomes high; or that fever, diarrhœa, dysentery, cholera, erysipelas, and diseases of the zymotic class, should prevail.

The tendency to die, to which law all living things are constantly subject, and against which none can rebel, is greatest where its power and authority have been most acknowledged and displayed; where death has been, reducing organization to disorganization, there death lingers, greedy to overcome the law of life, which, while it lasts, builds up organization out of disorganization. Disease, therefore, which is a manifestation of this law, of this tendency to die, is the natural, necessary, and inevitable consequence of the fearful state of things which at present exists. There is this consolation, however, that this consequence, frightful and devastating though it be, is remediable. The causes of disease *may* be removed, and the consequences *may* thus be averted. London, surrounded as

it is by stagnant putrid ditches, as some cities are by walls; emitting from its untrapped sewers, its thousands of filthy streets, and myriads of disgusting nuisances, noisome smells and volatile poisons, as fatal as arsenic, may have all the great sanitary improvements carried into every one of its thousands of streets and tens of thousands of houses, for the small weekly sum of 3½*d.* "The work may be thoroughly done, and all immediate and contingent expenses provided for, at a cost of less than a groat a week for each family." Nay, it is confidently affirmed by those who have given most attention to the subject, that the refuse of the town alone would be amply sufficient to defray all the necessary expenses.

"The disease-mist," says the Registrar-General, "arising from the breath of two millions of people, from open sewers and cesspools, graves, and slaughter-houses, like an angel of death, has hovered for centuries over London: but it may be driven away by legislation. If this generation has not the power to call up the dead from their graves, it can close the graves of thousands now opening. The poisonous vapour *may* yet clear away from London," "and some of the health of the country be given to the grateful inhabitants."

The pecuniary loss and misapplication of money which the inhabitants of London are calculated to sustain annually from a neglect of sanitary measures, amounts (according to a detailed estimate of Dr. Lyon Playfair, for Manchester) to £3,264,531.

The table on p. 67 exhibits a detailed estimate of the pecuniary expense which is entailed upon the metropolis, by the excess beyond the loss of life experienced at Camberwell which is preventible in each district. This table does not, however, include many of the expenses which ought to be included, as the support of orphans, the expense arising from an excess of births, &c. &c.

If the health of the metropolis were raised to a mortality of 1 in 50, in place of 1 in 48, which was the mortality in Camberwell in 1841, the loss would be found to be much greater.

For England and Wales the loss and cost is calculated at

£11,000,000, and for the United Kingdom at little less than the interest of the National Debt, viz. £20,000,000.

The space of time usually allotted to one lecture compels me to refrain from the consideration of many of the other agents which deteriorate the health of the inhabitants of the metropolis; such as the unrestricted sale of quack medicines, and of narcotics, which are largely made use of to lull children to an everlasting sleep;—the ventilation of courts and alleys, by the pulling down of buildings, which prevent a free access of air, and form *cul-de-sacs*;—the necessity of regulating lodging-houses;—of providing public conveniences for the comfort of the wayfarers in this extensive city;—of suppressing dairies, cattle-markets, and the slaughtering of cattle, in the very centre of the town;—of suppressing the smoke arising from manufactories, and the enormous and pestilential nuisance of grave-yards. All these noxious agencies enter into an extended consideration of the subject of this lecture, and might be treated of with great advantage, but I believe I have already trespassed sufficiently, if not too long, on your time.

I have not considered it my province, more than very briefly, to advert to some of the moral consequences which result from the state of things which I have described. It is not for the physician, but for the moralist, and the minister of religion, to point out to you the terrible abyss into which physical wretchedness plunges a community; but this much I may tell you, that the physical degradation of the masses of the poor is a measure of their callousness and indifference to all good things, whether spoken to them by the voice of man, or of God through His minister; and that this truth is dawning upon the minds of all thinking and reflecting men, —that before a man, in such a state of callous misery, can be made a good son, husband, father, or citizen, I would almost dare to say, or Christian, his home must be made clean, and the impurities by which he is surrounded, removed. As surely as his physical strength and mental energy will become developed and increased under the influence of sani-

tary improvements, equally surely will his moral perceptions, his feelings, affections, and sentiments become elevated, and his sense of religion, and his consciousness of his duty to his God and his fellow-man be exalted.

It is the direct interest and duty of every operative and of every tradesman, and the duty and indirect interest of every one above that rank, to endeavour to promote the advent of sound and efficient sanitary regulations. It is every man's interest, *because*, every man's health and longevity are more or less dependent upon sanitary regulations; *because*, his own happiness and comfort are greatly influenced by them; *because*, his ability to labour, and, consequently, his wealth, would be increased by them; *because*, the poor would thereby be made more sober and better men, inasmuch as the moral depression which results from a constant association with filth and the respiration of foul air leads to drunkenness, immorality, and crime. It is the duty of every man, *because*, the health and life of his offspring are greatly dependent on them. But it is more especially the duty of every Christian, *because*, by them religious impressions and feelings would be more readily received and retained, and the bounties of God appreciated.

It is most assuredly a truth, that unless the physical and social condition of the people be amended, no great progress can be made in spreading the doctrines of morality or religion.

With the knowledge, that a great and lamentable amount of sickness, disease, and mortality; an infinite extent of misery, wretchedness, and poverty; and much drunkenness, immorality and crime, are produced by the operation of certain well-defined agencies: and that the agencies which produce this sad catalogue of consequences may be altogether removed, and the consequences themselves entirely averted; nay, that certain of these very agents, which, when left on the soil, uncared for, spread the seeds of disease and death, may be deprived of their noxious properties, and made subservient to the comfort, happiness, and wealth of the people, by causing the earth to bring forth her fruits abundantly:—with the knowledge, I say, of these facts, he who does not labour to promote sanitary regulations, lays himself under a fearful

responsibility to the beneficent God who, in His goodness, placed him in a rank of life above, or in a situation remote from the operation of, the fatal influences which it has been my endeavour to lay before you.

REGISTRATION DISTRICTS.	Total Loss of Money value of Productive Labour, at 10s. per week Men, and 5s. per week Women, say 7s. 6d. per week to each Adult Individual.	Total Loss on the Year's Deaths in			
		Sickness.	Funerals.	Labour.	Total.
	£	£	£	£	£
Camberwell	—	—	—	—	—
Greenwich	34	14,252	2,545	46,002	62,799
Hackney	—	—	—	—	—
Kensington and Chelsea	13	2,912	520	17,368	20,800
St. Martin-in-the-Fields	85	1,820	325	28,390	30,535
St. George, Hanover Sq.	125	840	150	102,250	103,240
Islington	47	—	—	25,333	25,333
Stepney.	31	4,284	765	32,798	37,847
St. James, Westminster	70	—	—	27,790	27,790
Rotherhithe	26	2,100	375	4,784	7,259
Marylebone	97	15,820	2,825	183,039	201,684
Poplar	73	924	165	25,842	26,931
Strand	92	2,016	360	47,932	50,308
Pancras.	88	11,200	2,000	143,616	156,816
St. Giles	83	6,328	1,130	57,602	65,060
Westminster	123	5,656	1,010	89,913	96,579
Shoreditch	47	14,756	2,635	51,982	69,373
Lambeth	62	4,900	875	79,422	85,197
East and West London	104	21,168	3,780	121,472	146,420
Whitechapel	114	20,461	3,655	131,328	155,444
St. George, Southwark.	83	6,608	1,180	48,804	56,592
City of London . . .	123	—	—	67,158	67,158
Newington	62	1,764	315	34,844	36,923
Clerkenwell	75	6,356	1,135	49,350	56,841
St. George-in-the-East .	73	7,532	1,345	38,982	47,859
Bermondsey	68	3,696	660	26,996	31,352
Bethnal Green . . .	31	4,648	830	23,157	28,635
Holborn	46	6,300	1,125	21,390	28,815
St. Saviour & St. Olave	179	23,436	4,185	197,079	224,700
St. Luke	80	4,732	845	38,560	44,137
Total . . .	—	194,509	34,735	1,763,183	1,992,427
Average . .	75	—	—	—	—

Appendix A.—Page 10.

I have compiled the following Table from the returns of the Registrar-General, to illustrate the proportion of deaths, in 1838, from epidemics, occurring in each district of the Metropolis, to the population.

Population in 1841.	Districts.	Proportion to the Population.	Population in 1841.	Districts.	Proportion to the Population.
		one in			one in
71,758	Whitechapel	83	31,091	Poplar	140
51,407	St. Saviour and St. Olave.	86	25,195	St. Martin-in-the Fields...	162
41,351	St. George-in-the-East ...	94	43,894	Strand	165
56,718	Westminster	97	115,883	Lambeth	166
74,087	Bethnal Green	99	56,709	Clerkenwell	173
73,284	East and West London ...	102	66,433	St. George, Hanover-sq...	173
54,250	St. Giles	102	137,955	Marylebone	174
34,947	Bermondsey	115	114,952	Kensington and Chelsea..	174
129,711	Pancras	116	13,916	Rotherhithe	196
46,622	St. George, Southwark ...	120	54,607	Newington	198
49,982	St. Luke	123	55,720	Islington	216
83,552	Shoreditch	123	37,407	St. James, Westminster...	221
39,720	Holborn	125	55,967	City of London	227
90,657	Stepney	134	39,867	Camberwell	262
80,811	Greenwich	138	42,274	Hackney	269

Appendix B.—Page 13.

The mean age at death, deduced by summing up the ages of all who die, and dividing the amount thus obtained by the number of persons who have died, is open to many objections, and cannot be relied on as the basis of sanitary statistics.

If the mortality falls heavily on the aged, the mean age at death will appear to be high; while if the mortality falls chiefly on the young, the mean age at death will appear to be very low. There are many diseases which peculiarly affect children, such as scarlatina, measles, hooping-cough, &c. If, therefore, there are many children in a district, and if scarlatina be epidemic, the mean age at death will be greatly reduced by the mortality which it will occasion.

Appendix C.—Page 28.

Since the delivery of this Lecture, the following nuisance has come under my observation. Between the Canal and the back of St. Matthew's-place, Hackney-road, entering from Anne's-place, a night-man has formed a reservoir for every conceivable kind of filth; it covers a triangular space of ground, the sides of which respectively measure 177, 126, and 114 feet. The dung, refuse, filth, &c. are piled up to a considerable height, except where the contents of the cesspools are thrown. By the side of this triangle, leading from Anne's-place, there is a ditch, filled with most offensive and putrid matters, precisely the

same as in Lamb's-fields; it is about 390 feet long, and varies from two to ten feet in width. At a right angle there branches from it a smaller, but equally filthy ditch, about 300 yards long. In taking notice of this frightful and pestilential nuisance, I have not taken into consideration two or three mountainous heaps of ashes, cinders, &c., which are not positively offensive and noxious. The odour given off from this place is beyond conception disgusting; it spreads to a great distance, and is complained of by all around as an intolerable nuisance.

The existence of these nuisances in Bethnal Green, so long after the passing of Lord Morpeth's Act for "the removal of nuisances," clearly indicates that the task of their suppression must be laid upon some public functionary.

Appendix D.—Page 36.

"In the case of liquid manure, the cost of conveyance and application would be so small as to increase the relative value of the manure itself, and to yield a large profit on the capital employed. This profit has been variously estimated at from 12 to 15 per cent."

"It seems highly probable that the value of town-manure annually wasted would be equal to the loss and cost entailed upon the nation by premature death and sickness. According to this supposition . . . the total annual waste from these two causes would be about £40,000,000!" —*Dr. Guy, on the Application of the Refuse of Towns to Agricultural Purposes.*

"The city of Paris gets a clear revenue of 80,000 francs from the right of allowing certain persons to empty and carry away the night soil."—*Dr. Granville, Report of the Select Committee of the House of Commons on Metropolitan Sewage Manure.*

Appendix E.—Page 61.

Mr. Toynbee has submitted the following resolutions on the subject of ventilation:—

1. That no living, sleeping, or work-room shall contain less than 144 superficial feet, or shall be less than 8 feet high.
2. That such room shall have one window, at least, opening at the top.
3. Also, an open fire-place.
4. That in every living, sleeping, or work-room, erected in future, some method shall be adopted of allowing the foul air to escape from the upper part of the room.
5. That every such room, erected in future, shall have some means of continually admitting fresh air.
6. In every public building in which gas is used, to insist upon the use of plans to carry off the products of combustion, and not to allow them to escape in a room.
7. That all churches, schools, theatres, workshops, workhouses, and other public buildings, shall adopt such methods of ventilation as are approved by the medical officer of health.

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